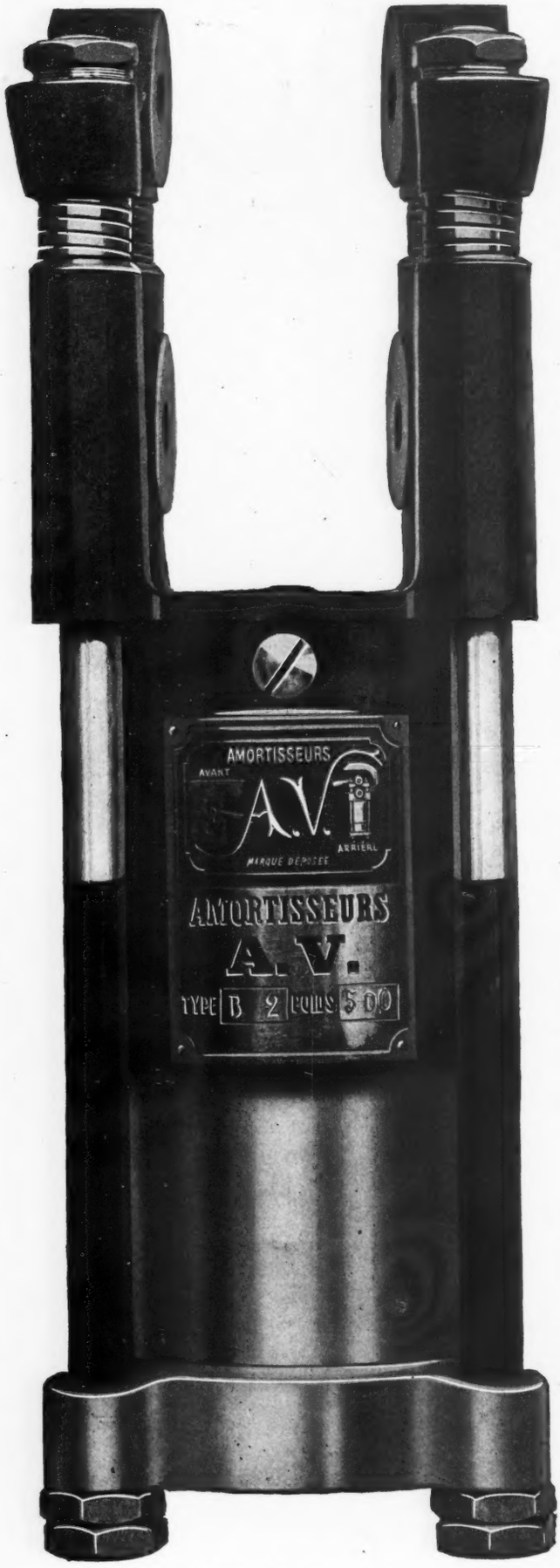
MOTOR AGE

July 17, 1913

10 Cents a Copy





Actual Size of A. V. Shock Absorber and Shackle

THE SHOCK ABSORBER THAT HAS SUPERSEDED ALL OTHERS IN EUROPE

The A. V.

(A. Vermersch & Cie.)

Hydraulic-Spring Shock Absorber

INCLUDING THE BEST FEATURES OF ALL ABSORBERS WITH CERTAIN IMPORTANT ORIGINAL FEATURES.

$35 per pair and up

Made for both front and rear

The A. V. Shock ABSORBER is only 6" high and made in diameters to suit the weight of the car.

They take the place of your spring shackle without any special attachments.

An opportunity to handle the A. V. SHOCK ABSORBER is now open to dealers and jobbers throughout the country.

A complete line of sizes specially constructed for commercial vehicles.

HUDSON EXPORT & IMPORT CO.
140 West 42nd Street — **New York City**

RHINELAND MACHINE WORKS
1254 Michigan Avenue, Chicago, Illinois — **650 Woodward Ave., Detroit, Michigan**

JOHN V. WILSON CO.
1424 Vine Street, Philadelphia, Pa. — **220 Pleasant Street, Boston, Massachusetts**

STANWELD



NO automobile manufacturer can make the claim that he is giving his customers the utmost in safety, satisfaction and service, and not equip his cars with Stanweld Demountable Rims.

Stanweld Demountable Rims are good rims—good all the way through.

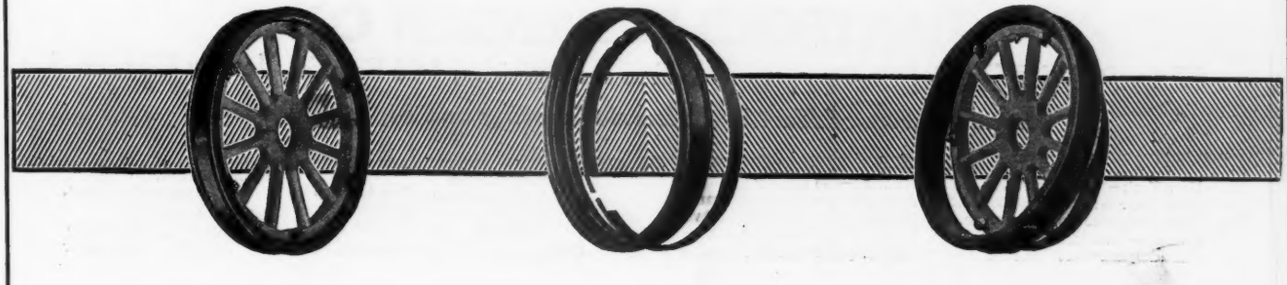
They are made of a high-quality steel, and by expert workmen. They prevent tire-wobbling—one of the prime causes of excessive tire wear. They require no special tools. They have a solid base—excluding dirt and moisture. They accept either straight-side or clincher tires. They have both the quick-detaching and demountable features—operating independently.

They are safe, easy and quick to operate, and require fewer manipulations to change a casing or tube than any other type of demountable rim.

One manufacturer will use nearly 50,000 sets during the coming season.

The Standard Welding Company, Cleveland

Distributors in Principal Cities of the United States



New Automatic Truffault-Hartford has Established New Ideal in Motoring Comfort

All that the original Truffault-Hartford Shock Absorber has meant to the two hundred thousand owners whose cars are equipped with this devise—in increased comfort, greater tire mileage and greater car efficiency—is realized to even fuller extent by the New Automatic Truffault-Hartford Shock Absorber.

This latest Truffault-Hartford model gives absolute immunity from jolt, jar and vibration for any car with any kind of spring, over any sort of road.

This greater efficiency results from the three tension principle upon which the New Automatic is built. There are three separate and distinct degrees of frictional tension in this new shock absorber, each coming into play as the condition calling for its use arises.

The first tension, while very slight, is sufficient to absorb the small spring oscillations on smooth roads and produces an effect equivalent to riding in a Pullman coach over a rock-ballasted railway.

The second tension offers frictional resistance calculated to meet the change of road conditions from a boulevard roadbed to one of moderate roughness.

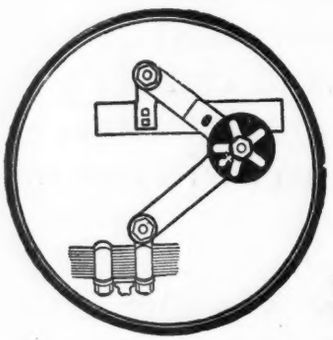
The third tension exercises the proper restraint necessary on exceptionally rough roads and completely absorbs the car-racking, tire-killing jolt otherwise inevitable.

These tensions are all positively automatic in action. They respond immediately to a change in the condition of the road.

The nature of the car's spring equipment does not effect the New Automatic's efficiency. Both stiff and highly flexible springs benefit.

Like the famous

Truffault-Hartford
SHOCK ABSORBER
"The Pioneer Shock Absorber"



—the New Automatic does not detract from the car's appearance. The additional comfort it imparts wins the enthusiastic approval of your lady passengers. $60 per set of four.

Write for new catalog giving complete information of this and other models.

Insist Upon Truffault-Hartfords on Your New Car

HARTFORD SUSPENSION CO.

EDWARD V. HARTFORD, Pres. **Office and Works, 146 Bay St., Jersey City, N. J.**

Manufacturers of Hartford Electric Starting and Lighting System

BRANCHES

New York—1700 Broadway
New York—212-214 West 88th St.
Boston—319-325 Columbus Ave.
Chicago—1438 Michigan Ave.
Philadelphia—1437 Vine St.
Newark—289 Halsey St.
Jersey City—141-143 Morgan St.
Kansas City—1524 Grand Ave.
Detroit—803 Woodward Ave.
Indianapolis—448 No. Capitol Blvd.

DISTRIBUTORS

Chanslor & Lyon
San Francisco Los Angeles
Seattle Portland
Spokane Fresno
Coughlin & Davis, Cincinnati, O.
Reinhart Bros. Co., Inc.
Minneapolis, Minn.
John Millen & Son
Montreal Winnepeg
Toronto Vancouver

MOTOR AGE

Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

Volume XXIV JULY 17, 1913 No. 3

Contents

LA BELLE FRANCE WINS GRAND PRIX..... 5
Boillot repeats in Peugeot, with Goux running second—Victor averages 72.06 miles per hour

GRAND PRIX REALLY FUEL ECONOMY RACE..... 8
Conditions of international classic outlined—Facts about constructional details of cars

MORGAN SIDECAR FIRST TO FINISH..... 10
Bedelia captures honors in cyclecar division of grand prix

EDITORIAL—LESSONS TAUGHT BY GRAND PRIX..... 14

GOOD ROADS PAY FOR THEMSELVES..... 15
Views of government on value of highway improvement

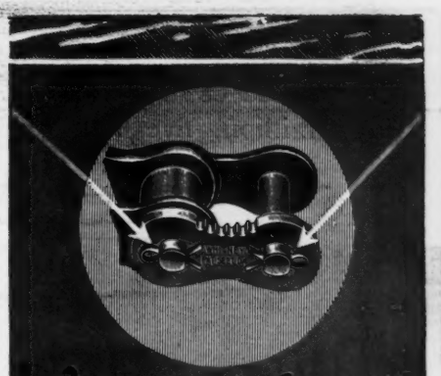
HOOSIERS HALF WAY TO THE COAST..... 16
Adventures of Indianians in Colorado described

NATIONAL TOUR NOW ON ITS WAY..... 18
Ten out of eighteen cars surviving with perfect scores at end of fourth day

LATE DEVELOPMENTS IN MANUFACTURING FIELD..... 23
The Jesco starting and lighting system—Herreshoff announces four and six-cylinders for 1914—Changes in the National—Cadillac to use a two-speed axle—The Imp cyclecar

DEPARTMENTS

Routes and Touring Information Department 20
Realm of Commercial Car..... 28
Readers' Clearing House..... 32
Motor Car Repair Shop..... 36
Housing the Motor Car..... 37
The Accessory Corner..... 38
From the Four Winds..... 40
Among Makers and Dealers... 42
Brief Business Announcements. 44



WHITNEY CHAINS
ARE BUILT FOR STRAINS

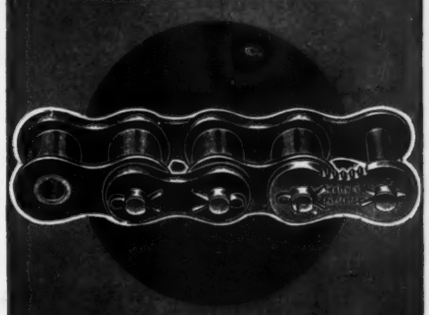
WHITNEY CHAINS are the most practical for motor vehicles.

They can be distinguished by the presence of cotter pins, which means that every WHITNEY link is quickly and easily detachable for the lengthening, shortening or repair of the chain. An ordinary screw driver or a pair of pliers will do the trick in a few minutes.

Made from steel, calculated to resist the greatest wear.

Look for the Cotter Pins

The Whitney Mfg. Co.
HARTFORD, CONN.



Endurance is the supreme test Five times around the earth and still good—two hundred fifty million, five hundred forty thousand revolutions under load do not wear out

New Departure Ball Bearings



During the life of these bearings, five sets of bearings of another type were worn out and replaced. New Departure ball bearings work with the least friction and, therefore, give maximum wear and service —American made and guaranteed.

Write for interesting literature

The New Departure Manufacturing Company, Bristol, Conn.

WESTERN BRANCH, 1016-17 FORD BUILDING, DETROIT, MICHIGAN

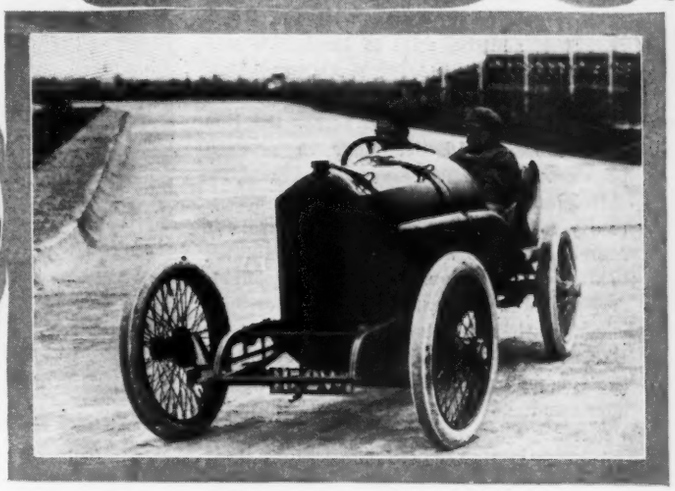
VOL. XXIV, No. 3 CHICAGO, July 17, 1913 $3.00 PER YEAR

MOTOR AGE



La Belle France Wins the Grand Prix

GEORGES BOILLOT



THE VICTORIOUS PEUGEOT

Boillot Repeats in Peugeot with Goux Running Second—Victor Averages 72.03 Miles Per Hour

ORDER OF FINISH IN GRAND PRIX.

No.	Car and Driver	Country	Time	M. P. H.
14	Peugeot, Boillot	France	7:53:56	72.03
8	Peugeot, Goux	France	7:56:22	71.66
1	Sunbeam, Chassagne	England	8:06:20	70.19
2	Delage, Babiot	France	8:16:13	68.80
10	Delage, Guyot	France	8:17:58	68.55
9	Sunbeam, Resta	England	8:21:36	68.06
16	Schneider, Champoiseau	France	8:44:37	65.07
5	Excelsior, Christians	Belgium	8:57:23	63.05
20	Schneider, Thomas	France	9:04:00	62.75
6	Schneider, Croquet	France	9:12:56	61.74
11	Excelsior, Hornsted	Belgium	9:37:40	59:01

By W. F. Bradley

PARIS, July 12—Special cablegram—Georges Boillot justified his title of "Europe's greatest road driver" and the powerful Peugeot again proved itself Europe's fastest motor car today when the daring Gaul and his fleet blue monster of steel won the French grand prix in the 569-mile fuel consumption road race around the Amiens triangle and repeated their triumph of last year.

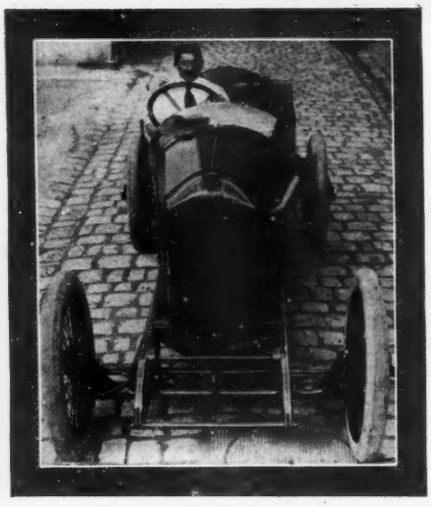
In his victorious drive twenty-nine times around the 19.64-mile course, Boillot averaged 72.03 miles an hour and established a new speed record for the grand prix, shattering the mark of 70.61 miles an hour made by Nazzaro in the Italian Fiat in 1907.

Today's race was a decisive triumph both for French drivers and French cars. Of the eleven machines, out of the twenty starters, to finish, seven bore the tricolor of the proud republic and only two of the French drivers—Gabriel, of the No. 12 Schneider and Delpierre, pilot of the No. 18 Peugeot—were forced to abandon the spectacular and grueling contest because of disabled mounts.

Running less than 3 minutes behind the conquering Boillot, Jules Goux, winner of the Indianapolis 500-mile race Memorial day, finished in second place with the No. 8 Peugeot and shared the honors of the day with his triumphant teammate.

Chassagne, who was nominated to drive the No. 1 Sunbeam at the proverbial eleventh hour when Victor Rigal was forced to withdraw because of injuries sustained in practice for the Spanish grand prix, interrupted the monotonous but joy-out procession of French cars across the finishing line by taking third with the English speed creation.

France was not to be denied the lion's share of the honors for the day, however.



BOILLOT AT THE PEUGEOT WHEEL

Bablot and Guyot, at the wheels of the consistently performing Delage, trailed Chassagne's Sunbeam and finished fourth and fifth respectively. Resta, with the No. 9 Sunbeam, added a mite to England's consolation honors by taking sixth money but the banner of France was again raised when Champoiseau flashed across the line with the No. 16 Schneider in seventh position.

Belgian sportsmen had their first opportunity to cheer when Christian's Excelsior roared over the home stretch 13 minutes behind Champoiseau. Two more Schneiders, tooled by Thomas and Croquet, finished ninth and tenth while Hornsted's Excelsior was the last car to be clocked by the timers, trailing in eleventh position 1 hour and 43 minutes behind Boillot's Peugeot.

All Paris Hails Victor

Two of the five nations represented in the classic, Italy and Germany, failed to finish a single entry, the three Itala cars and the Opel and Mathis, from the empire of the kaiser, being eliminated by mechanical trouble before the race was half completed.

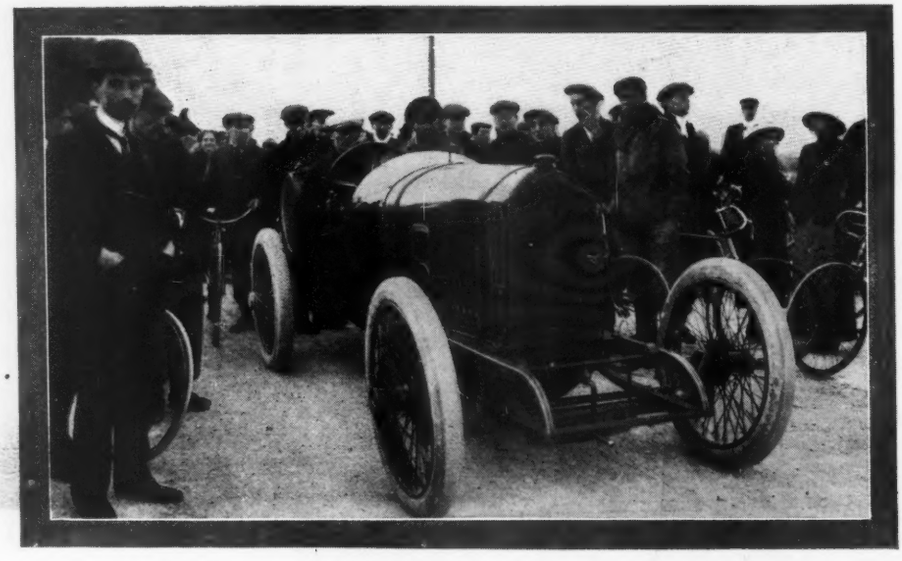
Tonight the victor is hailed in the cafes and along the boulevards of Paris as the peer of Victor Hemery and Louis Wagner, whose wilted laurels he has inherited and revived. Boillot's two consecutive triumphs have erased from the French mind the humiliating memory of Nazzaro's victory in 1907 and the success of Lautenschlager the year following, smarting French defeats that resulted in the abandonment of the grand prix for three years.

Unlike the 2-day contests of 1906 and 1912 and differing materially from the three other previous events of 1-day duration, today's race was not only a test for speed but for feul consumption as well, the cars being restricted to 1 gallon of gasoline for each 14.1 miles. Boillot's record of 72.03 miles an hour is all the more remarkable because of this restriction, the question being raised before the race whether or not the cars could attain the same high speeds at Amiens under the new conditions as they did at Dieppe last year when Boillot averaged 68.7 miles an hour in his victorious drive of 956 miles.

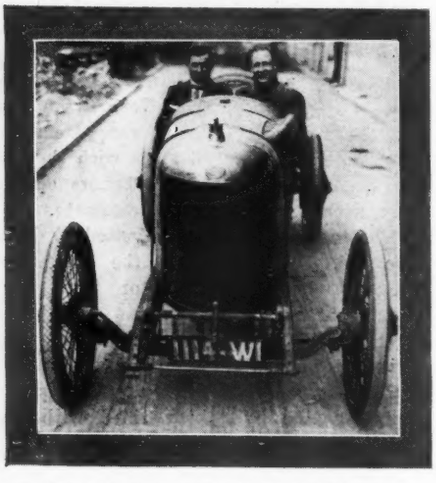
Bablot Overly Cautious

All of the cars finished with gasoline in the tanks, Boillot having 5¾ gallons, Goux 7¼, Guyot 6¼ and Bablot 7¼ at the completion of the 569-mile flight. Fuel economy, however, probably lost Bablot the race. The driver of the No. 2 Delage was overly cautious and at the outset stalled his motor three times. Also on the first hill he was unable to crank his car and was obliged to run it backwards to start the engine.

Although the sun's heat was intense, the



JULES GOUX, WHO FINISHED SECOND AFTER LEADING AT START



GUYOT, FIFTH IN THE DELAGE

CHARACTERISTICS OF CARS ENTERED IN

CAR	DRIVER AND NUMBER	Cylinder	Bore and Stroke	Magneto	Carburetor	Valves	Main Bearings
DELAGE France	2 Bablot 10 Guyot	4 mono-bloc	4 by 7.08 inches	Bosch also spare Bosch	Claudel	Horizontal in head 4 per cylinder	Five ball
EXCELSIOR Belgium	5 Christiaens 11 Hornsted	6 sets of three	3.5 by 6.29	Bosch	Claudel	One side 2 per cylinder	Seven plain
ITALA Italy	7 Nazzaro 13 Pope 17 Moriondo	4 pairs	4.9 by 6.6	Bosch	Itala automatic	Itala rotary	Five plain
MATHIS Germany	4 Esser	4 Mono-bloc	2.5 by 4.3	Bosch	Claudel	One side 2 per cylinder	Three plain
OPEL Germany	3 Joerns	4 mono-bloc	3.5 by 6 ins.	Bosch	Opel	In head inclined 45 degrees 2 per cyl.	Five plain
PEUGEOT France	8 Goux 14 Boillot 18	4 mono-bloc	3.9 by 7.08	Mea	Claudel	Inclined in head 4 per cyl.	Three ball
SCHNEIDER France	6 Croquet 12 Gabriel 16 Champoiseau 20 Thomas	4 mono-bloc	3.77 by 7.48	Bosch	Claudel	One side stems inclined, 2 per cylin'r	Three plain
SUNBEAM England	1 Chassagne 9 Resta 15 Caillois 19 Lee Guinness	6 sets of three	3.14 by 5.9	Bosch	Claudel	One side stems inclined, 2 per cyl.	Seven plain

drivers experienced little tire trouble. Boillot changed rubber but once during the race and Goux stopped only four times at his pit for new shoes.

The start, which was scheduled for 5 o'clock in the morning, was delayed until a dense fog lifted. This change in the plans was fortunate for after the cars were sent away, the weather conditions were ideal. The day was hot and without wind, adding somewhat to the discomforture of the spectators but in no way handicapping the competitors or their cars.

When the cars roared by the grandstand for the first time, Goux was in the lead with Chassagne, Guyot and Boillot in determined pursuit. For seven rounds of the tortuous circuit, the diminutive winner of America's speedway classic held that advantage but on the eighth lap he was passed by Guyot, another of the foreigners who invaded America this spring and returned to France with a purse fat with United States coins.

Guyot's Mechanic Hurt

The chubby-faced driver of the Delage maintained the lead for eight laps and then fell back, never to regain the lost position again. After covering 314 miles without a stop at the pits, the Delage blew a tire. The mechanic jumped from the car before it stopped and was run over by the machine. Picking up his unconscious helper, Guyot drove slowly back to the stands with the injured man, changed tires and took on a relief mechanician. This was his only stop in his mad journey of 569 miles but it proved a costly one.

Although he lost the coveted lead, Guyot was not disheartened and met Goux and Chassagne wheel to wheel in the pursuit of Boillot who went to the front when the Delage blew the tire. From the seventeenth lap on to the finish, Boillot was conceded the victory by the throngs in the stands.

A record lap of 77.5 miles an hour, covered by Bablot in the Delage, was about the only honor that did not go to Boillot.

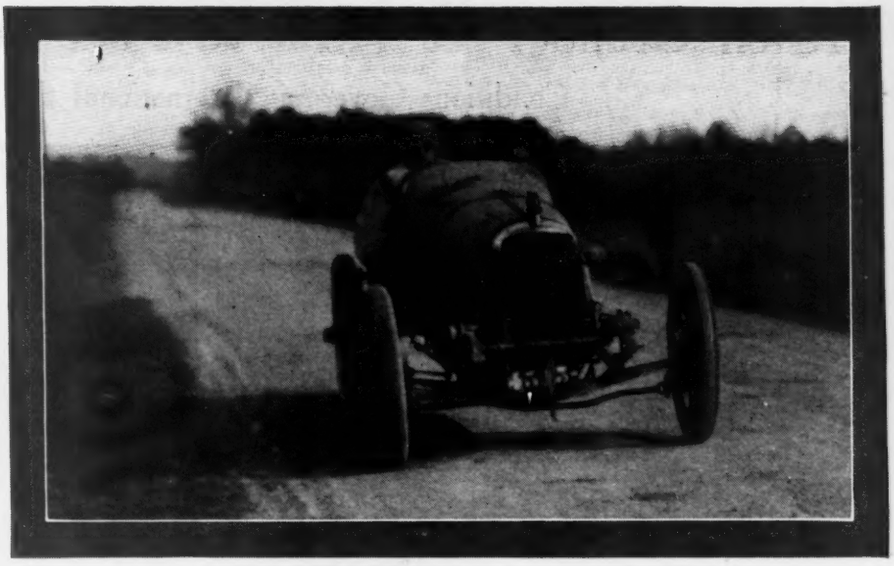
The first lap of the race was disastrous for the Opel, which burned out a bearing and forced Joerns to dock the German entry before its motor was fairly warm. Pope's Itala met the same fate early in the race.

Spectator Is Killed

The turn under the bridge on the Boves leg of the course seemed the most difficult to negotiate, two cars being eliminated and one fatality occurring at this sharp corner. Delpierre, who was named to drive the third Peugeot after the death of Paul Zuccarelli, went off the road at this point and although uninjured, was forced to retire from the race after an examination of the battered and twisted machine. A short time afterwards, Lee Guinness, in desperate pursuit of the flying pacemakers, met with an accident near the wreck of the abandoned Peugeot, the Sunbeam breaking a wheel, plunging into the river and killing a spectator. The English driver was thrown clear of the car and suffered only minor bruises.

Moriondo, the pilot of the No. 17 Itala, overturned on the cinder banking near the stands but righted his car and gamely continued the race with a bent steering gear. He ultimately was forced to abandon the hopeless chase after the leaders, the universal of the Italian machine seizing.

Nazzaro drove cautiously—too cautiously—and not at all in the dare-devil manner of his heyday. He never got out of the ruck and abandoned the Itala with broken dumb irons after completing ten laps. Callois' Sunbeam broke a tortion member early in the race.



GUINNESS' SUNBEAM, WHICH PLUNGED INTO RIVER NEAR BOVES



CHASSAGNE, WHO TRAILED PEUGEOTS

FRENCH GRAND PRIX, AMIENS, JULY 12

Lubrication	Cooling	Clutch	Drive	Gear Ratio	Tires	Tire Sizes	Wheels	Weight	Wheelbase Track
Forced feed low pressure	Pump no fan	Multi-discs	Shaft No Torque or raidus rods	2.4—1	Continental	Rear 880x120 870x90	Rudge	2,090 pounds	108 ins. 51 ins.
Forced feed	Pump	Leather cone	Shaft Torque tube	1.88 -1	Palmer	Rear 880x120 875x105	Adex wire detach	1,980 pounds	104 ins. 51 ins.
Forced feed	Pump	Multi-discs	Shaft Torque tube	2.5 —1	Continental	Rear 880x120 875x105	Rudge	2,310 pounds	118 ins. 55 ins.
Forced feed	Pump	Multi-discs	Shaft Torque tube		Continental	760x100	Wire	1,900 pounds	96 ins. 51 ins.
Forced feed	Pump	Leather cone	Shaft	2.4—1	Continental	880x120 875x105	Rudge	2,000 pounds	106 ins. 53 ins.
Forced feed low pressure	Pump no fan	Inverted cone Ferrodo lined	Shaft no Torque or radius rods	2.3—1	Pirelli	Rear 880x120 875x105	Rudge	1,980 pounds	106 ins. 53 ins.
Forced feed high pressure	Thermo Syphon no fan	Leather cone	Shaft Torque tube	2.43 —1	Continental	Rear 880x120 750x90	Rudge	2,128 pounds	110 ins. 55 ins.
Forced feed high pressure	Pump no fan	Leather cone	Shaft no diff. Torque member	2.5 —1	Dunlop	Rear 880x120 815x105	Goodyear steel detachable	2,200 pounds	118 ins. 54 ins.

French Grand Prix Really a Fuel Economy Road Race

Conditions Governing International Speed Battle



RIGHT-ANGLE TURN THROUGH VILLAGE OF MOREUIL



GRAND PRIX COURSE THROUGH VILLAGE OF THENNES

PARIS, July 2—With a distance of 569.68 miles to be covered, the amount of gasoline given to each car in the French grand prix is 40.3 gallons, being at the rate of 14.12 miles per gallon. All of the fuel has to be taken on board at once and placed in a circular section tank with two vertical divisions to prevent swinging of the liquid. These tanks are a standard pattern imposed by the club and must be placed at the rear of the driver's seat, without any covering over them. The gasoline line also must be entirely external, and on most of the cars is placed along the right-hand side frame member, and is either thickly wrapped with adhesive tape or has small blocks of wood placed between it and the frame to cut out vibration.

Seal Caps on Tanks

The gasoline is measured by being placed in a funnel-like tank tested by the government weights and measures department. The allowance is made at a temperature of 15 degrees centigrade, correction being made for any increase or decrease over this temperature. From the funnel tank the fuel is allowed to flow directly into the car tank, the car having been backed immediately under the measuring instrument. By this method every drop of fuel placed in the measuring tank reaches the car tank, and as soon as the supply has been obtained the filler caps on the tank—for there are three of them—are sealed. If this seal is broken the car is eliminated.

The carbureter is sealed also, as well as the gas line and all connections. Competitors are given the privilege of choosing their own gasoline from about eight or nine well-known makes on the French market. The fuel is bought by the French club in the usual 5-liter sealed cans, and the seals of these cans are broken only in the presence of the competitors immediately before pouring into the measuring instrument.

Facilities are allowed to prevent impurities or water getting into the tanks. The commercial brands of gasoline employed have a density varying from 715 to 720.

This year's race is the second one held in France on a fuel consumption basis. The first of this kind was run at Dieppe in 1907, when the allowance was at the rate of 9.4 miles to the gallon. Nazzaro in a Fiat was the winner on that occasion, and his average speed for a rather shorter distance than has to be covered this year was 70.5 miles an hour. Although the fuel supply has been cut down one-third, it is believed that this year's cars can beat those of six years ago. There is even a possibility that this year's racers will prove faster than those of last year, when absolute liberty was allowed. In 1912 the late David Bruce-Brown finished the first day's race at Dieppe at an average of a little more than 72 miles an hour. For the total distance the speed was 68.5 miles per hour. Close comparison, however, is not possible, for the distances are not the same and a certain amount of time was lost last year in getting the cars away on the second day.

Tanks Filled on Friday

The twenty competitors in the race at Amiens will be brought to the official inclosure on the course the day before the start, where they will be weighed and the tanks filled. The weight restrictions are a minimum of 1,763 pounds and a maximum of 2,425 pounds, without tools, oil, gasoline or water. The committee has the right to cause crankcases to be emptied. When the tanks have been filled and sealed the machines will be pushed into separate lock-up boxes, where they will be guarded by soldiers until the time for bringing out on the morning of the race.

The start of the race has been fixed for 5 a. m., the competitors getting away at intervals of 1 minute. As the course is roughly 20 miles round, and has been covered in 15 to 17 minutes during practice, there probably will be two or three men on the line when the first car comes round. The special banked track uniting the two main legs of the course will be used for the start. This is a banked cross road 220 yards in length, straight along its central portion, with the two ends rounded off. It has been built of concrete rich in cement, and has on the outside the grand stands, press stands, various offices, etc., and on the inside the line of tire pits. As the tanks are filled and sealed before the start of the race, there will be no gasoline in the pits. The work will thus be confined to changing tires and supplying oil and water if needed. No limitation has been placed on the amount of oil consumed in the race. It was at first proposed to hold the cars down to a reasonable supply of lubricant, but owing to the technical difficulties in the way this idea was abandoned. All work must be done on the cars by the driver and his mechanic; the pit attendants have to confine themselves to handing up whatever articles are required.

The course with grand stands built around it is an innovation in French motor racing. This idea was adopted in order to avoid a difficult hairpin turn, and also to give the facility of arranging the stands that spectators could arrive and depart while the race was in progress. It was found cheaper to buy the land than to rent, thus the whole of the tongue of ground between the two almost parallel main legs was secured by the racing board of the French club.

Build Pit Promenade

The pits, as already explained, are on the inside of the straight section of the cross road, and have a depth of about 5 feet. Immediately in front of the line of pits is a slightly raised sidewalk covered with fine cinders and having a granite curbing. The surface gives a good foot-

hold to driver and mechanic when working on the car, and the curbstone is sufficiently high to prevent a car skidding over into the pits. On the outside of the concrete track is a wall of finely-sieved cinders mixed with metal shavings, to act as a buffer in case a car gets out of control. This banking is continued right round the two ends, there being a safety zone behind it, then stout boardings.

The grandstands being on slightly higher ground, the spectators can look over the banking into the pits on the opposite side of the track. A tunnel under one end of the track gives communication between the stands and the pits. The timer's box is placed at the entrance to the banked turn; the time is thus taken before the stoppage at the pits, giving the driver the advantage of a fast lap.

Five Countries Represented

The twenty cars in the race represent France, England, Germany, Italy and Belgium, the respective teams being Peugeot, Delage, Schneider for France; Sunbeam for England; Opel and Mathis for Germany; Itala for Italy, and Excelsior for Belgium. Judging only from what has been seen in the practice work, the most dangerous cars are the Peugeots and the Delage. Owing to the death of Paul Zuccarelli, the Peugeot team has been reduced to two; it does not appear likely that the third car will be placed in the hands of Louis Wagner, as originally proposed. Delage has only entered two cars.

Peugeot has a certain advantage over the other competitors in possessing a set of cars on which a large amount of valuable experience had been gained, and which could serve as the starting point from which to build up the 1913 racers. Thus, this year's cars are improvements on the two racers which appeared in the Indianapolis 500-mile race. Most of the details have been changed, but all the outstanding features are the same. The cylinders are a monobloc casting of 3.9 by 7.08 inches bore and stroke. The valve arrangement is the same as on last year's cars, there being four valves per cylinder inclined in the head and operated by enclosed overhead camshafts, each cam working within an eccentric forming a stirrup-shaped member with a stem-forming valve tappet.

The changes are an improvement in the method of guiding the eccentric, and the placing of the return spring inside the camshaft housing instead of outside it. The valve timing is distinctive, there being a lead to the admission, so that inlet and exhaust valves are open together for a brief period. Details of this have not been given out.

Camshaft Operation

Each camshaft is entirely independent and can be lifted away from the long bolts projecting from the cylinder head complete with its camshaft pinion. Last year a vertical shaft with bevel gearing was used to drive the camshafts. In some of the races a little trouble developed with this, and for greater security a train of spur pinions is used, there being three intermediates between the crankshaft and camshaft pinions. This train of gears is inclosed in a very light and neat aluminum housing. Water circulation is by pump, without the use of a fan, the pump being worked off a cross shaft. This year, for the first time, a Mea high-tension magneto is employed; the plugs are placed directly in the cylinder head.

The cylinders of the Peugeot racer are a block casting with integral intake manifold, but independent exhaust manifold. There is a very short straight length of intake piping between the Claudel carbureter and the manifold proper. This carbureter is not heated in any way. As on the Indianapolis racer, there is a wire gauze air intake and a hand hole through the side of the bonnet opposite the carbureter. Last year's three-point suspension has been preserved with detail modifications. The sub-frame forms an elongated U with a trunnion attachment at the front and a ball and socket attachment at each extremity. These rear attachments are not entirely rigid, but have a spring connection similar to that of the fore and aft connecting rod of a steering gear. The sub-frame carries motor and gearbox, there being a universal joint between these two units.

One of the distinctive features of the Peugeot racers is the lubricating system. No oil whatever is allowed to remain in the crankchamber. Working from one of the intermediate pinions at the front end of the motor is an oil and air pump which maintains pressure on an oil tank under the driver's seat. By reason of the pressure, the lubricant is driven out of the tank to six sight-feeds on the dash and from them by suitable leads to the motor bearings. A big quantity of oil is sent through, all the pipes being large diameter.

Peugeot Oiling System

As the oil works out of the bearings and drops into the crankchamber, it is taken up by the pump and driven back to the oil tank. When there is no oil in the base chamber, the pump delivers air to the tank. A considerable amount of ingenuity had to be expended in designing a pump which would deliver oil or air, as required, and which would not seize when deprived of oil. From the long tests which have been carried out, this lubricating system gives entire satisfaction. The bearings can be flooded with oil, but it is impossible to make the motor smoke. The oil also keeps considerably cooler, for it is in a tank isolated from the heat of the motor and is allowed to cool in its passage to and from the motor. On the main feed pipe admitting to the sight feed is a cock which on being closed cuts off the ignition. Thus, when the motor is stopped there is no possibility of the pressure in the tank forcing the oil out through the sight feeds until atmospheric pressure is established. Under this system of lubricating the amount of oil consumed has been reduced to a minimum.

The crankshaft, which is built up of BND steel, is carried on three ball bearings, the front and the central bearing being single and the rear one double. The balls have a diameter of 1 inch. Pistons and connecting rods are machined out of BND steel, the rods being of I-section and very light. Although steel pistons are used, there is no special oil lead to the cylinder walls, it being found that the lubricant working out of the bearings is quite sufficient.

The flywheel is somewhat lighter than usual. The clutch is an inverted cone type, the female member being ribbed to give additional stiffness, owing to the light construction. Four speeds are provided in the gearbox, the whole of the selector mechanism being inside the box. The main shafts are hollowed out and all gears are cut of BND steel. Final drive is by propeller shaft with two universal joints fitted with ball bearings, and a bevel gear rear axle having a reduction of 2.3 to 1. The rear axle, as on the last year's model, is built up of two steel tubes machined out of the solid, with a central aluminum differential housing. This year's axle is not trussed. There are neither radius rods nor a torque tube, the springs only being relied on for taking the drive and the reaction. Instead of being outboard, the rear springs are immediately under the main frame members, and also under the rear axle.

Not only are the Peugeot racers remarkable mechanical productions, but they have been finished off in a way which would do credit to a show model. The front axle is lined with wood front and rear in such a way as to diminish head resistance and at the same time give a little extra solidity. The transverse connecting bar is treated in the same way. The underpan is absolutely clean cut, for as there is no oil-drainer and no sump to cool, it has been possible to make a one-piece pan without any openings. The radiator is very narrow, but flat-surfaced; the bonnet is tapering and is followed by a scuttle dash, with inclosed sides for the driver's and mechanic's seats. If it had not been for the big official tank, a very fine stream-like body would have been obtained.

By means of a worm and screw, the rear brakes can be adjusted while the car is in motion, the mechanician lifting up a hinged trap in the floor boards for this purpose. The gasoline tank is fitted with a La Force indicator, and also with a pressure indicator. Pressure is only necessary to get the last drop out of the tank. Very close attention has been paid to the question of weight, and although the Peugeots have not yet been on the official scales, it is estimated that they will only slightly exceed the minimum of 1,763 pounds.

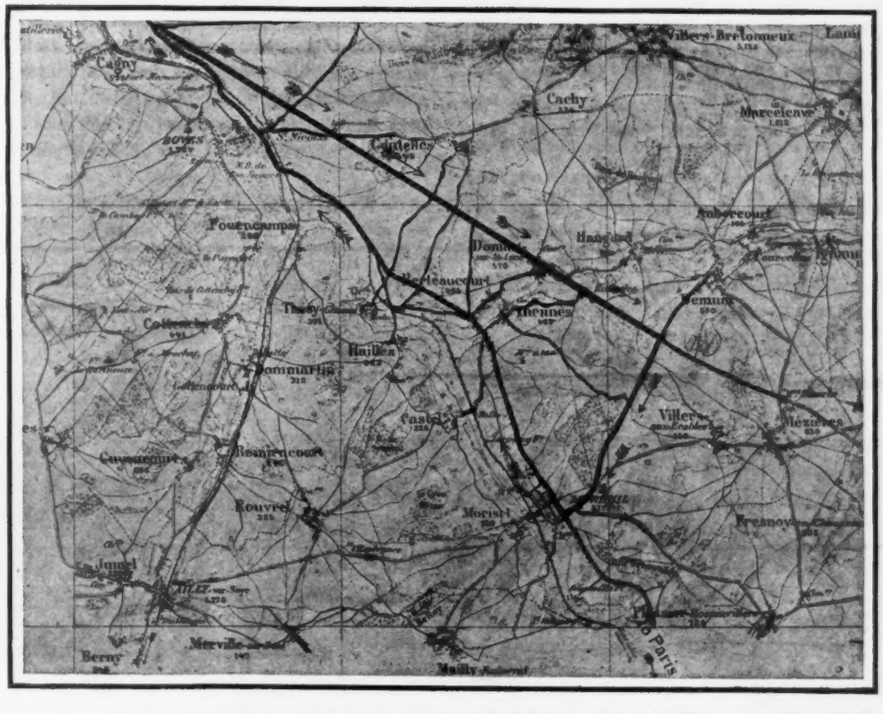
Points About the Delage

Delage has produced a pair of cars having a great similarity with the Peugeot racers. The bore and stroke is 4 by 7.08 inches, the cylinders being a single casting with four valves per cylinder mounted horizontally near the head and operated by two camshafts with vertical rods and bell cranks. This general arrangement of valves was used on the Delage 3-liter racers so successful in 1910.

The crankshaft of the Delage racers is built up and is carried on five ball bearings, the balls having 1-inch diameter. Steel pistons with three rings and I-section connecting rods, all of BND steel, are employed. The Delage engineers have taken the precaution of fitting two magnetos, both being driven and set exactly like, but only one being wired. In case of break-down it would only be necessary to change over from one magneto to the other.

Claudel has supplied the carbureter, which is connected up to the cylinder group by a four-branch piping. Forced feed lubrication is employed, the pressure being moderate. A gear pump delivers the oil to the main ball bearings, then through oilways in the shaft to the connecting rod ends which are lined with white metal. Castor oil is used for lubricating purposes and in addition to the supply in the sump there is a reserve quantity in a dashboard tank.

The Delage motor is mounted directly on the main frame members, and the gearbox to transverse frame members. Five speeds and



MAP SHOWING AMIENS GRAND PRIX COURSE

reverse are provided. Final drive is by propeller shaft and bevel gearing with two universals on the shaft, the drive being taken through the forward half of the rear springs. Although no unnecessary weight has been placed on the car, the Delage must be at least 120 pounds heavier than the Peugeot. It has a snub-nosed radiator and a very clean underpan, but offers a little more head resistance than its rival. The wheelbase is a little longer, but the track is 2 inches less than that of the Peugeot.

Sunbeam has preferred to run with a set of four six-cylinder racing models, having a great similarity with the successful 3-liters of last year and not differing very appreciably in design from the standard models. The cylinders are in two castings with all the metal cut away between the foot of each cylinder. Their dimensions are 3.14 by 5.9 inches. The casting is of the L-type with valve stems inclined to improve the form of the combustion chamber. Instead of the plugs being placed over the intake valves they are as near the head of the cylinder as the water outlet pipe will allow. A three-point suspension is used for the motor, the subframe having a trunnion attachment at the front and rigid attachment to the main frame members at the rear. Reciprocating parts are of Vickers steel, the steel pistons, complete with wrist pin, but without rings, weighing ⅞ pound. Seven plain bearings are used for the crankshaft, oil being delivered to them under pressure; white metal is used for the connecting rod ends. In common with the Delage and Peugeot racers, the flywheel is very light and is cone shaped to receive the clutch.

The feature of the rear axle is the abolition of the differential, the shaft being of chrome nickel steel with the crown bevel wheel mounted directly on it. The gear ratio on high is 2.5 to 1.

Itala Uses Rotary-Valve Motor

Particular interest attaches to the Italas by reason of the use of the firm's rotary-valve motor. This consists of a water-cooled rotary distributor common to two cylinders, and is similar in general design to the distributor used on the firm's touring car. The cylinder bore is the highest to be found in the race, being 4.9 inches, with a stroke of 6.6 inches. None of the other makers of four-cylinder motor has exceeded 4-inch bore. The cylinders are a pair casting with cylinders carried on five plain bearings. Shaft drive is employed with the use of a torque tube. These cars have not been observed in practice with the others and no opportunity has been afforded of judging their speed ability. They have the disadvantage of being very close to the maximum weight allowance, but by reason of their distinctive valve mechanism will be watched with interest.

Excelsior, like Sunbeam, is running with a couple of six-cylinder motors, their dimensions being 3.5 by 6.29 inches. The cylinders are in two castings of the L-type, with valve stems inclined outwards.

Schneider has a team of four cars distinctive by reason of the dashboard location of the radiator and the use of thermo-syphon cooling. These are the only cars in the race not making use of a water pump. Cylinder dimensions are 3.77 by 7.48 inches, with valves on one side and stems inclined outwards.

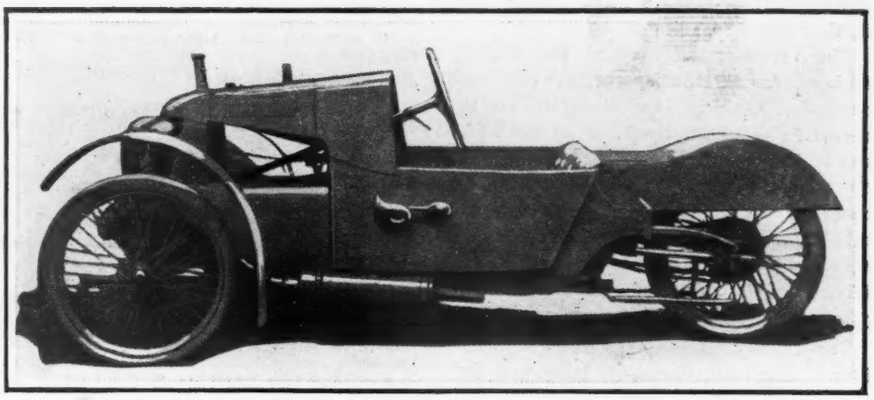
Opel also has a four-cylinder, bore and stroke being 3.5 by 6 inches, valves being placed in the head and inclined at 45 degrees.

The Mathis is a very small light car which has not sufficient power to be taken seriously as a competitor for first place.

It is worth noting that automatic carburetors are used on all the cars. Claudel has supplied all the makes but two.

Morgan Side Car First One to Finish

Bedelia Captures Cyclecar Division of French Grand Prix—Little Machines Average Better than 40 Miles an Hour for 165 Miles



MORGAN SIDE CAR, FIRST TO FINISH

Order of Finish in Cyclecar Race.

Pos.	Car and Driver	Time	M. P. H.
1	Morgan, McMinnies	3:53:09	42.8
2	Bedelia, Bourbeau	3:55:54	41.2
3	Sphinx, Canouel	4:05:11	40.3
4	Ronteix, Ronteix	4:11:16	39.44
5	Duo, Peyrecave	4:12:24	39.33
6	Super, Leveque	4:12:32	39.33
7	Violet-Bogey, Poullex	4:16:47	38.7
8	Ronteix, Jolibers	4:30:15	36.7

PARIS, July 13—Special cablegram—Averaging 42 miles an hour over the Amiens triangular course of 165 miles, W. G. McMinnies, driving the three-wheel sidecar Morgan, this afternoon led the field across the wire in the first international cyclecar race ever run in Europe and partially atoned for the defeat of the English Sunbeams by the Peugeot in the French grand prix of yesterday.

Bedelia Cyclecar Winner

Although it finished in second place, according to comparative times, Bourbeau's Bedelia scored as decisive victory as the Morgan, which is entitled only to first honors in the sidecar division and is not ranked with machines of the Bedelia type.

As an aftermath of the sensational motor car classic, this afternoon's event was an unqualified success and proved to the most skeptical spectators that the diminutive machines, whose efficiency is so keenly disputed, not only have wonderful stability but also are capable of developing high speed.

Little Machines Run Fast

The contest also proved that the light machines can hold the road when traveling at a high rate of speed. Only one of the thirty-six cars in the race turned over. The unfortunate driver was Contenet, the pilot of a Bedelia, who sprang a cropper at the difficult corner near the railroad bridge on the Boyes leg of the course where two of the grand prix contenders were disabled the day previous.

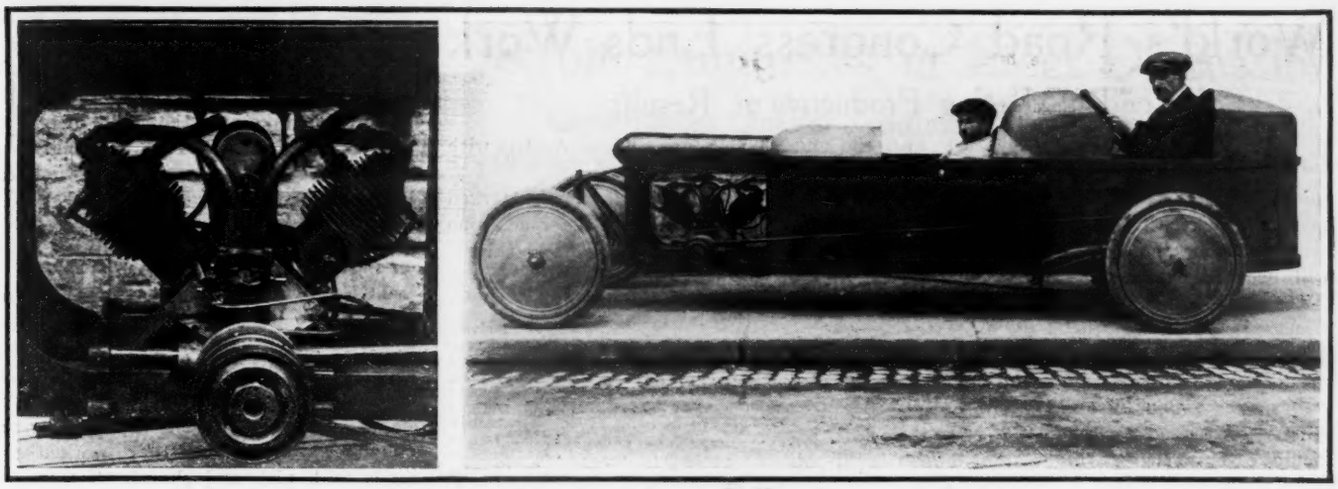
At the start of the race, Bourbeau, driving the Bedelia which finished second 3 and a fraction minutes behind the Morgan, went to the front and set the pace for four laps. The Marlborough, tooled by Samuelson, then took the lead and maintained that position for four laps when it was retired because of overheating.



WHERE COURSE PASSES THROUGH BOVES



SCENE IN VILLAGE OF DOMART



VIEWS SHOWING MOTOR AND SIDE APPEARANCE OF THE BEDELIA

With the Marlborough docked, McMinnies, who had been delayed by a punctured tire, crept up and went into the lead, never to be headed although seriously challenged by the Violet-Bogey and Canouel's Sphinx.

The mudguard on the Violet-Bogey became detached and the mechanic carried it in his arms for six laps but stopped on the fourteenth round on being told that he was risking disqualification. The Violet-Bogey lost first place by seconds only but later was disqualified for breaking the rule that required that mud guards remain in position throughout the race. The Mathis, which showed a lot of speed and finished ninth, was disqualified for the same reason. The winner of the race is editor of the English weekly, The Cyclecar.

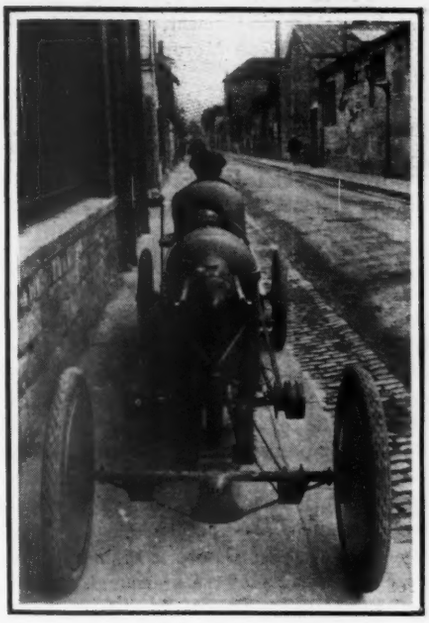
Characteristics of Winners

The Bedelia, which won in the cyclecar class in the grand prix, has a number of new features which set it in a class by itself. The Bedelia, it will be remembered, is the first real cyclecar ever produced. It is from this car that the cyclecar movement has sprung.

The original cars had the motor in front, as at present, but drove from there by chain to a countershaft under the front seat of the car. This shaft projected on either side and the drive to the rear from here was by motorcycle V belts. Gear change was had by two diameters of pulley on the countershaft ends.

In the present machine the arrangement is different. The body design is much the same but the motor is a 90-degree twin giving better balance than was possible with the narrower angle. The drive is direct from the motor shaft on both sides instead of through a countershaft, eliminating considerable of machinery. The firm has found long belts such a decided advantage that it has gone to the extreme in this car.

Change of gear is accomplished automatically. On the ends of the shaft are the V pulleys with the inner flange fixed. The outer shaft is movable and is operated by a centrifugal governor. When the motor speed is high the flanges are thrust close together, giving a high gear ratio for fast work. When the power is applied to an extent to slow the motor the pulley widens and the gear drops to low. This is entirely automatic so that all the driver has to do is to watch spark and throttle.



FRONT VIEW OF BEDELIA

This effects the tension of the belts somewhat, so that these are taken care of by sliding the motor on trunnions fore and aft. This is done by pedal and is the equivalent of a clutch. Of course when the motor is idle the pulley flanges are far apart and the belts too loose for traction.

The idea is very simple and works well on this light car, allowing also of very cheap manufacture of the product.

The Morgan Sidecar

The Morgan cyclecar, which ran in the motorcycle-and-sidecar class on account of being a three-wheeler, nevertheless is a cyclecar. This machine holds the world's record for speed on the track for cyclecars, and is very light and efficient for roads which will allow of a three-wheeler. The firm is now experimenting with a four-wheeled car, however.

This machine has a V-type motor set crosswise across the front of the car to get all the air possible. A shaft runs back from this to a gear counter shaft and from this chains run from two sprockets to the rear wheel. Dog clutches connect one sprocket or another to change gear.

The grand prix car was fitted with a special water-cooled V-type motor contrary to the usual standard air-cooled 90 degree Jap motor usually used by this firm. This motor was of about 12 horsepower.

It is significant that the first places in the race were won by real cyclecar types of extreme simplicity, again shattering the faith of those who have depended on the small-car idea as the only method of making a cyclecar. The winners are the cheapest priced of those made, not cheap through poor workmanship or material but through inherent design, and they showed in the long grind at high speed that they were more reliable and faster than the gear-driven small-car.

TABULATED HISTORY OF FRENCH GRAND PRIX

Year Distance Miles	No. of Starters	No. of Finishers	Winner	Time	M. P. H.
1906—774*	29	11	Szisz, Renault, France	12:14:05	63.35
1907—478.3	38	16	Nazzaro, Fiat, Italy	6:45:33	70.61
1908—478	49	23	Lautenschlager, Mercedes, Germany	6:55:43	69.50
1909—No race					
1910—No race					
1911—No race					
1912—956*	46	14	Boillot, Peugeot, France	13:58:02	68.70
1913—569	20	11	Boillot, Peugeot, France	7:53:56	72.03

*Two-day race.

World's Road Congress Ends Work

London Meeting Productive of Results

LONDON, June 27—After a week of valuable discussion and deliberation, the third annual international road congress closed here today after Munich had been awarded the 1914 congress, which will be well attended.

The question of universal lights was discussed at great length by the delegates and the suggestion that fast vehicles should carry more powerful lights than slower ones found general favor. Resolutions to the effect that all vehicles should carry lamps at night, that high-speed motor cars should be equipped with headlights in addition to the two lighted lamps in front and one behind, that all drivers of herds of cattle should signal their presence by night, and that colored lights for motor cars should be suppressed were adopted.

The wear of roads also was a matter discussed in which motorists are vitally interested. Effective waterproofing of the road surface was advanced as a means of minimizing highway deterioration and the general use of tar macadam advanced as a remedy for water-bound roads affected by high speeds. It was suggested that the use of steel-studded tires be forbidden and that the equipment of heavy vehicles with wheels of small diameter and improper tires be restricted.

As to the administration of the roads funds and the functions of authorities dealing with them, the conference decided that where centralized systems are in force these should be encouraged and state management of road construction was generally favored.

In regard to sign posts, the delegates went on record as favoring posts of iron with arms of wood—the arms to be not less than 2 feet 6 inches long, at least 7 inches deep and the lowest arm not less than 8 feet from the ground. Inscriptions in bold, black, block letters on a white background were recommended, as well as the abandonment of the superfluous words "to" and "miles" and the use of the index finger pointing to the name of the town or the distance, as these occupy space that could be used to better advantage for bolder lettering.

The delegates were the guests of King George V one afternoon at Windsor Castle, tea being served and the visitors given an opportunity to inspect the pictures, tapestries, arms and trophies of the state apartments.

ELEVEN PERFECT IN ALPINE TOUR

Vienna, July 1—Traveling through mud, snow and rain for 1,654 miles and traversing some of the most dangerous and treacherous passes in the Alps, fourteen cars out of forty-seven starters Saturday completed the third annual Alpine tour of the Imperial and Royal Motor Club of Austria with perfect scores.

Of the fourteen cars that were unmarked for mechanical trouble on the road, nine escaped punishment marks in the final examination for condition held here today. The roll of honor is as follows:

Car	Driver
Rolls-Royce	C. C. Friese
Minerva-Knight	F. Guidenus
Horch	G. Paulmann
Laurin-Clement	O. Hieronimus
Benz	W. Delmar
Raba	Sirutschek
Audi	Lange
Audi	A. Graumuller
Audi	L. Obruba

In addition to the above named, the following cars were not penalized for road work: Minerva-Knight, G. de Jong; Horch, Dr. Stoss; Laurin-Clement, Count Kolowrat Puch, Miss Helene Morariu, and Fiat, M. Schneeweiss.

Cars representing eight nations competed for the seventeen valuable trophies offered and two members of the royal family participated, Archduke Joseph Ferdinand and Archduke Heinrich Ferdinand.

GRAND RAPIDS RUN POSTPONED

Grand Rapids, Mich., July 4—Apathy on the part of local dealers, added to the extreme heat of the season and crowded conditions at the summer resort hotels, has caused the postponement to some later, indefinite date of the second annual Grand Rapids reliability tour, which was scheduled for July 21-25. Should sufficient interest be manifested later application will be made for a sanction covering dates late in September or early in October. Sixteen entries were in the hands of the promoters, but several threatened withdrawals made a change of plans advisable.

SPROUL LAW CONSTITUTIONAL

Harrisburg, Pa., July 14—The decisons of the supreme court affirming the constitutionality of the Sproul act and also of the Hoke act relative to highways put under state ownership the several connecting turnpikes from the Bedford county line through Fulton, Franklin and Adams counties, southward to the Maryland line. Formal action was taken this week by the state highway department and by agreement of the department and tunrnpike companies the several turnpikes will be forever free by legal decree. By this action the state becomes the owner of about 75 miles of additional toll roads.

Two of the bills approved by Governor Tener and signed this week are of special interest to motorists of the state. The Buckman senate bill is a general motor vehicle act which increases the fees for power vehicles of all sorts. The other is the measure of Senator Hoke and gives the highway commissioner the power to take over at his discretion any abandoned canal or any part no longer used for the purposes for which it was intended where the canal is not used or occupied by a railroad or a railway in actual operation. It also provides that the highway commissioner shall take over the rights of way of a railroad or railway that have not been used or occupied for a period of not less than 5 years.

MAKING BOULEVARD IN MISSOURI

Columbia, Mo., July 12—The people of this city and Boone county started last week to build a boulevard through the county on the line of the state highway. It was not so much the actual work that was started as was the spirit displayed by the volunteer workers, as they worked the roads with pick and shovel. Two weeks after the notice had been issued the road was lined with workers and the work begun. Merchants, clerical forces of the banks, and in some cases society belles were ready to undertake any work that would improve the county roads. Several concrete contractors gave their men a day of "rest" so they might help put in culverts along the highway. More than 500 men from Columbia alone joined the workers. When the day's work was done most of the biggest holes had been repaired and everybody was ready for the next general road repair day to be announced by the Commercial Club.

NEW HAMPSHIRE'S REGULATIONS

Boston, Mass., July 15—New Hampshire has made some changes in the motor law at the present session of the legislature, and as the meetings are held every 2 years there will be no chance to make any changes in the law again until 1915. In order to take care of the new type of motorcycles with the carriage on the side the law was amended to include these among the motor vehicles. The most important change in the law relates to a neutral zone, which is a somewhat new step in motor legislation, and which other New England states will probably adopt now that Maine and New Hampshire have it. This new section reads as follows:

A motor vehicle owned by a non-resident of this state who has complied with the laws of his state relating to the registration and licensing of motor vehicles, who has a bona-fide actual residence in a state granting like privileges to residents of this state, which residence is located within 15 miles by highway of the borderline of this state, may be operated on any highways of this state distant not more than 15 miles from the border line of his state, if application for the registration thereof is made in accordance with the provisions of section 2 and the proper fee provided for in section 26 is paid and the said motor vehicle is duly registered by the secretary or his authorized agent. The secretary shall furnish at his office, without charge, to every person whose motor car is registered aforesaid, a metal tag of suitable design, oval in shape, to have displayed upon it the register number assigned to such motor vehicle, the letters N. H., and figures showing the year of the issue, but no such tag shall be furnished by the secretary for motorcycles. Such tag shall at all times be conspicuously displayed upon the front of such motor vehicle. Every application filed under the provisions of (a) and (b) of this section shall be sworn to by the applicant before a justice of the peace or a notary public.

Another section of the law was amended so that now motorcycles must have suitable lamps, and also they must use mufflers. In the old law the muffler cut-out nuisance was looked after, but motorcycles were not included. The law was also amended this year, so that "unreasonable noises" from blowing of horns, etc., and allowing smoke to escape to an unreasonable extent have been put under the ban the same way as in the Bay state law.

The non-resident who does not come under the 15-mile zone is still limited to 10 days, and undoubtedly officers will be stationed at Bretton Woods, the real motor headquarters for visitors to register such cars as remain longer than the specified time.

DISTRICT WEAKENS IN TAG WAR

Washington, D. C., July 15—Special telegram—The end of the long war waged between the District of Columbia and Maryland and lately taken up by the state of Virginia is in sight as the result of a decision reached today by the commissioners to rescind the order adopted by them last January compelling motorists from other states who use district roads to pay the same amounts for licenses that are assessed against Washington drivers who enter those commonwealths. Formal action revoking the order may be taken by the commissioners tomorrow, it is said in motoring circles.

While the object of the regulations was to establish reciprocity in license fees the district heads are convinced that it has worked a hardship upon Maryland and Virginia citizens and therefore believe it should be annulled. It is believed that the return to the former license arrangement under which a perpetual district license may be obtained upon the payment of $2 will result in establishing harmony between the District of Columbia, Maryland and Virginia in the matter of regulating motor vehicle traffic and put an end to any discriminatory practices which may be exercised by the authorities of those states against Washington motorists.

The commissioners have received assurances from Maryland and Virginia motorists that they will use their influence with their respective legislatures in obtaining the enactment of a law which will not impose a burden on district residents.

DELCO STARTS SUIT

New York, July 15—The Dayton Engineering Laboraties Co., Dayton, O., has filed suit against the Sidney B. Bowman Auto Co., of this city, for alleged infringement of patents Nos. 745,157 and 842,827, property of the Delco concern and Conrad Huber, and covering the starting and lighting system made by the Dayton company. The suit will not come up before October, when the United States district court, southern district of New York, will reopen for work.

Detroit Engineers in Steel Discussion

Government Official Addresses S. A. E. Branch

DETROIT, Mich., July 12—The Detroit section of the Society of Automobile Engineers, at its monthly meeting held on July 10, listened to some authoritative talk on the "Correlation of the Physical and Magnetic Properties of Steel" by Charles W. Burrowes, who has charge of the magnetic section of the United States bureau of standards at Washington.

For the past 6 or 7 years Mr. Burrowes has been investigating this relation of properties with the aim of devising methods of testing specimens of iron and steel magnetically and to thus fix the hardness, tensile strength, etc., without damaging the specimen in any way. Physical tests render the test piece useless.

Speaking of his experiences in this field, he stated that his first difficulty was in finding two pieces of steel of the same magnetic characteristics, so widely varying are the properties of steels which are supposed to have exactly the same composition.

The possibilities of such a method of testing for flaws in steels are many. Since magnetic testing does no damage, each piece coming to the factory might undergo test, and the present uncertainty that a shipment is all of the same grade and strength would be eliminated, for under present methods it is impracticable to test more than several specimens selected at random from the lot and then to assume that the balance conform to the same characteristics. However, such accurate testing of each piece would only be feasible for high grade material.

In going about his work, Mr. Burrowes has sought for the relation between the magnetic variations and the differences in mechanical inhomogeneities. However, if this magnetic means of testing is going to be helpful in detecting weak points, much experimenting on hundreds of specimens will be necessary. The idea is about as advanced as was the science of chemistry hundreds of years ago.

Steel which has been quenched at different temperatures shows up very differently mechanically, and it has been found that quite frequently magnetic softness and mechanical softness go together.

A number of interesting curves were shown to aid in the making clear the relation of magnetic properties and physical ones. Annealed and hardened steels have very different hysteresis curves, while there was also much variation in the normal induction curves for spring steel after various heat treatments.

Evidently there are certain definite laws relating to the magnetic and physical properties of iron and steel. Curves were shown which indicated that as the magnetic induction gets greater, the greater the tensile strength up to a certain point, after which the relation changes. The relation between the Brinnell hardness of specimens and the magnetic induction was also shown graphically, while the effects of special heat treatments on 1 per cent and 0.8 percent carbon steels brought certain definite variations in the magnetic properties.

At any rate, said Mr. Burrowes, if it is possible to separate properly from improperly heat treated steels by this magnetic method, we have gone a long way in the work.

The present patent crisis and its effect upon the motor car engineer was also discussed, the consideration of this topic being opened by E. J. Stoddard, who stated that a crisis was imminent due to the flood of patent bills being introduced into congress. There has been more or less dissatisfaction with the administration of patent law, largely arising through the inaptness of the judges in deciding mechanical and engineering questions.

Milton Tibbetts also spoke against the bill, stating that the mechanical and electrical engineering associations have passed resolutions against the Oldfield measure similar in their report to those passed by the Society of Automobile Engineers at its recent summer convention. In fact, engineers all over the country are working against the bill. The mining and civil engineering bodies will take action against it at their next meetings.

Otto Barther stated that the present law is comparatively satisfactory and sees no reason for change. However, the patent law at present is decidedly unsettled, due to the many conflicting decisions rendered. There should be some settlement of the law.

COLE CALLS CONFERENCE

Indianapolis, Ind., July 15—A conference on the standardized car is gathering under the auspices of the Cole Motor Car Co. This conference will be held in Indianapolis July 17 and 18. Officials representing manufacturers of parts will be present, to say nothing of a complete representation of Cole distributors from all over the United States and Canada.

The Cole company has called this conference in order that the president, sales managers, advertising managers, engineers and other prominent officials of their parts makers may be informed on the co-operative possibilities of the standardized car. Representatives will be here from the Timken Axle Co., Northway Motor and Mfg. Co., Mayo Radiator Co., Gemmer Mfg. Co., Timken Bearing Co., Dayton Engine Laboratories Co., Detroit Steel Products Co., Spicer Universal Joints Mfg. Co., Hydraulic Pressed Steel Co., Firestone Tire and Rubber Co., Warner Speedometer Co., Stromberg Motor Devices Co., Janney-Steinmetz & Co., Collins Curtain Co. and the Taylor Tire Pump Co.

RAMBLER REPORTS PROSPERITY

Kenosha, Wis., July 15—A million dollar increase in sales for the fiscal year, which ended June 30, with 317 orders for Cross Country cars unfilled on the morning of July 14, were facts included in a statement made by Second Vice-President G. M. Berry to the branch managers of the Jeffery company, who met in annual conference at the factory at Kenosha July 14. The actual increase in sales for the 12 month period, which began June 30, 1912, and ended June 30, 1913, was $1,025,850. The biggest increase made by any one of the branches represented at the conference was that of Kansas City, whose business was doubled during the year. New York is second with a 60 per cent increase, while Boston sold in the month of June this year 230 per cent of the total number of cars sold during the same month last year.

DATE FOR ELECTRIC CONVENTION

New York, July 15—The Electric Vehicle Association will hold no meetings in New York during July and August, but there is a possibility of one being held in September. Unless the latter takes place, the next big event will be the fourth annual national convention which will be held in Chicago on October 27 and 28. While the plans for this event have not been worked out as yet, the convention committee is busy preparing all the necessary details for the enterprise.

MOTOR AGE
Published Weekly by
THE CLASS JOURNAL COMPANY
910 South Michigan Avenue CHICAGO
NEW YORK OFFICE
239 West 39th Street
SUBSCRIPTION RATES
United States and Mexico
$3.00 per Year
Other Countries including
Canada $5.00
Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Lessons of the Grand Prix

WITH the running of the French grand prix, the Alpine tour and with still several most important events left on the 1913 calendar, Europe may be said to be once more firmly established in the competition saddle, once more a believer in contests as a means of interesting the buying public in motor cars. Having sat for a couple of seasons with its hands idle in its lap, Europe now is willing to admit that it made a mistake when it tabooed racing and reliability runs as business-getters.

THE running of the grand prix resulted in a second great victory for Boillot and the Peugeot, and the French taught the motor world a lesson—that great speeds can be maintained without excessive use of gasoline. With such stringent rules as prevailed, the engineers who designed the grand prix racers faced a situation which demanded that they turn out an economical motor which still possessed speed. Compelled to average 14 miles per gallon or be counted out, the foreign engineers improved on the rule-makers' deductions. This was evidenced by the fact that of twenty starters, eleven finished and with gasoline in the tanks, despite what was thought to be a niggardly allowance of fuel.

STILL more astonishing in connection with this was the fact that this years' grand prix was considerably faster than last year's, when gasoline was used with a lavish hand. Whereas in 1912 Boillot in a Peugeot averaged 68.70 miles per hour without any fuel restrictions, this year, in the same make of car, he jumped this average up to 72.03 miles per hour and still kept within the fuel limit.

IT is true that this year's grand prix had an entry list that looked small in comparison with previous years, but this was because of the fact that some of the old leaders still contend that it is unnecessary for them to support racing because they made their reputations in the early days. But those progressive makers who realize there is no time like the present to convince the public have stood by the promoters and it is believed that they will be well rewarded for their outlay, for the motor public, like all others, dearly loves a winner.

A Cyclecar Necessity

ALREADY there is need in America for a governing body for cyclecars. In Europe a cyclecar is a three or four-wheeled car with a motor of less that 67 cubic inches displacement, and a weight of 672 pounds or under. This definition has allowed of a wide diversity in the designs produced abroad, the main trouble having been in overdevelopment and high cost of the product, the makers striving to follow custom too largely instead of fitting the engineering to the new conditions of road and sales that the cyclecar has opened up. Nevertheless the definition is official and cars within the definition can enter cyclecar contests.

WITHIN a few months at the very most there will be cyclecar contests in America and the question then will arise as to who is eligible to enter. There is need for an official definition and it would seem that the European one should be adopted here.

WITH this end in view those manufacturers figuring on making cyclecars should get together before too expensive jigs and fixtures, etc., are made and decide on what a cyclecar is, making a recommendation perhaps to whatever motor body is to have charge of the new motoring.

ANOTHER advantage would be had in deciding a standard tread for cyclecars. On about 80 per cent of the cars announced this is 36 inches. If cyclecars could be of the same tread the roads about all our cities would have cyclecar tracks well worn down, and the machines nearest to the standard would find the best road on which to run. The present 56-inch car standard is considered too wide for cyclecars, and to have almost that standard is to court trouble on rutty roads. What is the standard tread to be? This is up to the manufacturers entirely, but they would do well to get together on this point.

ONCE the basic points are decided upon and a governing body is organized to handle the new motoring the makers can proceed with greater speed and with greater assurance that nothing will have to be done over to fit new standards when definitions are finally decided upon. One of the great reasons for the success of the cyclecar abroad has been that the industry has had a guiding definition almost from the start, and has had beside a magazine devoted to the movement which has boosted for the best things and simplest development from an unbiased and open-minded standpoint. Once America gets on the same footing Europe will be quickly outstripped, and America can produce for Europe better cyclecars than can be produced abroad for much more money.

THE cyclecar is a serious proposition and not a toy or fad, and makers undertaking the manufacture should give serious study to every point of its development, reliability and low cost being the first things sought.

Comfort for the Tourist

BEFORE starting on an extended trip a special precaution is to see that all of the storm curtains are in the car and it is good precaution to fit them all in place to see that they are in condition. If needed on a trip they will be needed in emergencies, at a time when nobody cares to waste seconds fitting them or still further to be inconvenienced by finding some of them lacking.

THe experienced tourist gets his tires in the best of condition before leaving. If he has some badly worn casings he will have them replaced before starting with new ones and will carry the old ones for emergency use. See that tire chains are of the right size and in condition. See that you have three or four extra inner tubes, extra tire patches, fresh patching cement and some extra tire valves. A supply of chalk is necessary. If going on a long trip it is economical to take some filler cement to repair surface cuts and it is often wise precaution to equip with a blowout patch, which may meet one of the many unexpected exigencies of such a trip. Look into your tool kit and see that you are supplied with all the little things so often needed for roadside repairs. It is by attending to these details that you get the most out of touring.



BUICK FINISHING SECOND IN LOS ANGELES-SACRAMENTO ROAD RACE

Good Country Roads Pay for Themselves, Uncle Sam Says

WASHINGTON, D. C., July 12—The direct effect that changing bad roads into good roads has upon land value and the general economic welfare of a community is shown in several concrete illustrations gathered by the United States department of agriculture. The department has just issued a statement on the subject, based upon a mass of information gathered by the office of public roads, which is making a special study of the economic effect of road improvement in the country.

According to data gathered, where good roads replace bad ones, the values of farm lands bordering on the roads increase to such an extent that the cost of road improvement is equalized, if not exceeded. The general land values, as well as farm values, show marked advances, following the improvement of roads. Among the illustrations cited by the department are the following:

In Lee county, Virginia, a farmer owned 100 acres, between Ben Hur and Jonesville, which he offered to sell for $1,800. In 1908 this road was improved, and although the farmer fought the improvement, he has since refused $3,000 for his farm. Along this same road a tract of 188 acres was supposed to have been sold for $6,000. The purchaser refused the contract, however, and the owner threatened to sue him. After the road improvement, and without any improvement upon the land, the same farm was sold to the original purchaser for $9,000.

In Jackson county, Alabama, the people voted a bond issue of $250,000 for road improvement and improved 24 per cent of the roads. The census of 1900 gives the value of all farm lands in Jackson county at $4.90 per acre. The selling value at that time was from $6 to $15 per acre. The census of 1910 places the value of all farm lands in Jackson county at $9.79 per acre, and the selling price is now from $15 to $25 per acre. Actual figures of increased value following road improvement are shown.

As the roads in no way effect soil fertility or quality of the farm, advances are due essentially to the decrease in the cost of hauling produce to market or shipping point. Farms are now regarded as plants for the business of farming, and any reduction in their profits through unnecessarily heavy costs for hauling on bad roads naturally reduces their capitalization into values. With reduced costs for hauling, profits are increased; with the result that the farm plant shows satisfactory earnings on a higher capital value.

The motor car also has begun to be an important factor in increasing rural values where good roads are introduced.

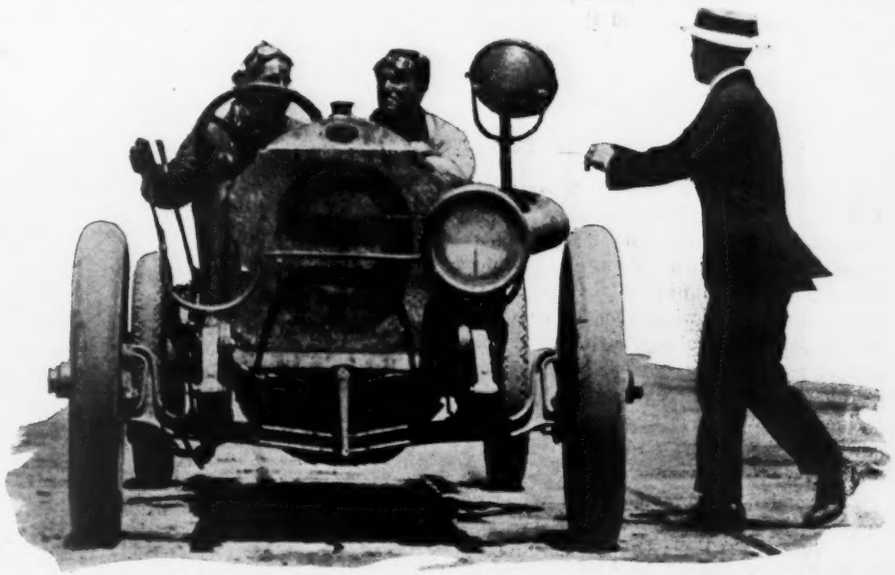
Immigration is particularly marked where road conditions are favorable; in fact, the figures of the department seem to indicate that good roads indirectly increase the demand for rural property; and the price of farm land, like that of any commodity, is ruled by the relations between demand and supply.

POPE DIVIDEND PASSED

Hartford, Conn., July 14—The preferred stock dividend of the Pope Mfg. Co. now due has been passed up. Retrenchment has of late marked the policy of the company. It is stated on what appears to be good authority that there is no occasion for alarm and that the company will be able to meet its obligations as they fall due.

GRAY & DAVIS SECURE WADSWORTH

Boston, Mass., July 14—G. R. Wadsworth, recently engineering manager of the Peerless Motor Car Co., Cleveland, O., with which company he has been connected for the past 3 years, has assumed associations with Gray & Davis, Inc., at Boston.



VERBECK IN FIAT, WINNER OF LOS ANGELES-SACRAMENTO RACE

Hoosiers Now Half Through on Run to the Pacific Coast

Adventures of Indianians on Long Trek



CROSSING THE MISSOURI RIVER AT OLD FRANKFORT, THE START OF THE SANTA FE TRAIL

By Darwin S. Hatch
Staff Correspondent

GRAND JUNCTION, Colo., July 15—Special telegram—With 1,800 miles, or one-half of their 3,600-mile transcontinental journey completed, eighteen cars in the Indiana Automobile Manufacturers Association's tour from Indianapolis to the Pacific coast checked in tonight in good order.

The only car yet to be heard from is the Brown truck. Like the Premier truck, this truck with its internal gear drive has been the life-saver of the tour, J. Holloway, its driver, playing the good Samaritan for all the local cars that got into difficulties in climbing the steep grades over the Rockies. In assisting one of the local escorts over a 25 per cent grade just west of State Bridge, Holloway stripped his low gear yesterday. He hopes to get to Rifle on second and high, where a new gear awaits him. He will catch up with the tour later.

Tourists Climb Rockies

Following the Midland trail out of Denver Sunday morning, the tourists commenced the long climb over the Rockies even before leaving the city. At its outskirts Inspiration Point was passed, one of the show places of the city, giving a view of 300 miles of mountains. To Golden, 14 miles out, an excellent hard gravel road, good in any weather, was found. From Golden the grade steepened in a winding road, known as the hogback, up Mt. Vernon canyon.

The road is red sandstone and good going, although the grade averages over 6 per cent and the road as a rule is very narrow. By the time the cars had reached the top of Floyd hill, 30 miles out, the grade, combined with the altitude, had all the radiators boiling, although the motometers showed a temperature of only 185 degrees in the cooling water. The rarified air was beginning to affect the power of the motors and air adjustments had to be altered.

The road down Floyd hill is a fine example of road building and the grades have been cut to 6 or 7 per cent by numerous switchbacks. The sharp turns are well marked with signboards and at the most dangerous and steep sides guarded with heavy cables. From the bottom of the hill the motorists followed a winding road through Clear Creek canyon to Idaho Springs, the luncheon stop.

As usual, the tourists were greeted with a brass band and an enthusiastic reception. Governor Ammons of Colorado, who accompanies the tour to Grand Junction, and C. A. Bookwalter responded to the welcome of the mayor. Idaho Springs claims the honor of being located on the site of the first discovery of gold in the Rockies in 1859. Also its medicinal springs give it the name of the Carlsbad of Colorado. For 15 miles the road climbs and winds along the river past Dumont, Lawson and Empire, all of them mining towns. The last named was one of the most booming of mining camps but the exhaustion of the gold and silver ore has left it practically deserted.

At Empire begins the real climb over the continental divide through Berthoud pass. The tourists now had before them a steady climb of over 4 miles in which they went 3,000 feet vertically. The last 1,000 feet change in altitude was covered in a mile. Some of the grades were as high as 20 per cent and the altitude affected the power of the motors very materially. The rarified air did not contain sufficient oxygen to thoroughly burn the gasoline so that the mixture was too rich to give more than a fraction of the power attained at lower altitudes.

Climbs Pass on Reverse

Most of the cars had difficulty in getting over without unloading passengers and some of them had to be assisted by the latter. In most cases this occurred when a car ahead stuck so that those behind had to stop on a grade. One clever driver, winner of a previous Glidden tour, by careful maneuvering got his car turned around and climbed the pass on reverse, a thrilling feat as the pass was sufficiently dangerous going forward.

At the top of Berthoud pass the tourists were above the timber line and in the realm of perpetual snow. The top of the pass is over 11,000 feet above sea level and the view of the Rockies from the flat table on top is wonderful. The ride down the pass demonstrated the staunchness of the cars as did the climb. Sharp turns, steep grades with a cliff on one side and a drop of thousands of feet on the other, the road a mere shelf just wide enough for one car, with turnouts at intervals, and an excellent roadbed marked the roadway itself. All that was needed was a steady hand at the wheel and good brakes. All the way down overhanging vistas were presented. After negotiating the pass the motorists entered the valley of the Grand river, which they were to follow in a general way clear to Grand Junction. This led them to Hot Sulphur Springs, 100 miles from Denver. Sulphur water flows out of the ground at a temperature of about 100 degrees and the feature of the town is the hot sulphur baths which have great medicinal properties.

Drive Through Canyons

This was the night stop. Monday's run was from Hot Sulphur Springs to Glenwood Springs, a distance of 107 miles. The ride was through canyons practically all the way with typical canyon roads and steep grades, but good roadbed most of the distance. A great deal of the road was entirely new where miles and miles of road was blasted out of the rock to lessen the grade. Road crews were at work as we passed.

The feature of the day's trip was the run through Gore canyon which globe-trotters claim nothing in the Alps could surpass. Like Hot Sulphur Springs, Glenwood Springs is famed for its natural heat baths, the great open air natatorium being the chief feature. Today's trip was about 110 miles in length and offered the greatest contrast in country of any one day so far. The tourists started out through the canyon of the Grand with the typical eyelash roads, passed convicts at work on the roads, traversed veritable desert country where no sign of animal life could be seen except coyotes and

gophers with the painted cliffs all around showing every color of the rainbow and the glistening white from the alkali deposits.

Just when the tourists began to talk about Inferno we ran into Palisades and the heart of one of the greatest fruit countries in the world. From Palisades to Grand Junction the route was a boulevard lined on either side with orchards.

The Pathfinder, running under sealed bonnet, with W. O. L. Westgard appointed official observer for the A. A. A., broke the bonnet seals 40 miles out of Denver on account of a shorting of the distributor from carbon from the brushes. It covered 1,504.7 miles from Indianapolis with a sealed bonnet.

Denver Host to Hoosiers

Denver, Colo., July 11—When the sixty five dust-covered motorists on the tour from Indianapolis to the Pacific coast pulled into Denver this afternoon each of the nineteen Indiana-made cars that carried them had covered 1,475 miles of their journey to Los Angeles and had blazed the trail to this point for the Lincoln highway, the cement boulevard across the continent for which Carl Fisher and others on the run are working so strenuously. After a day's rest in the mile-high city, the tourists will leave on Sunday morning on the next leg of their journey over the Midland trail for Hot Sulphur Springs, a ride which promises much of interest.

Tomorrow's day of rest will be appreciated after the steady grind across the prairies of Kansas and the mountains of Colorado. Leaving Kansas City on July 7 after the first week of touring, the Hoosier motorists camped at night at Junction City. The original intention was to lunch at Fort Riley, the military station 3 miles away, but it was found that though the gasoline gadabouts were free to camp there, military regulations prevented the government selling supplies to them, so that in order to get something to eat, it was necessary to make camp at Junction City. The soldiers entertained the tourists during luncheon, however, the regimental band giving a concert.

Here the tourists indulged in some horseplay by staging a "badger fight," of which C. A. Branston, the English motor car engineer accompanying the tour, was the victim. He was unanimously elected over Carl Fisher and Charles A. Bookwalter, former mayor of Indianapolis, as the one worthy of the honor of holding the "badger." The Briton had become sufficiently Americanized to appreciate the joke and enjoyed the "spoofing" as much as the others.

Junction City Live Town

Junction City is a very live town of some 6,000 inhabitants and 3 miles from the fort, but in spite of its small population has 4½ miles of paved streets.

Topeka, Kan., formed the first lunch stop of the second week of the tour and the motorists were welcomed by the mayor and Governor Hodges. The governor presented the tourists with a flag on behalf of the citizens of the state. Ex-Mayor Bookwalter accepted it with a speech outlining the object of the tour and the plans for the Lincoln highway. Lunch was provided by the Topeka Chamber of Commerce and the motorists left for Fort Riley, accompanied by Governor Hodges, who piloted the tourists to the state line.

The next day's run was through Abilene, Salina, Ellsworth and Hays to Ellis. At Ellsworth, the noon stop, the tourists had their first taste of entertainment at a private residence, the home of Col. J. C. Wellington being thrown open to them and luncheon served by the ladies of the town assisted by the local chamber of commerce. Meanwhile the local band entertained with a repertoire of music which, much to the delight of the Hoosiers, consisted chiefly of "On the Banks of the Wabash." As Kansas is a dry state, the governor was locked in an upstairs room while refreshments were served in the basement by Col. Wellington, who, by the way, is the president of the Golden Belt route.

Pitch Tents; Rain Follows

At Hays the local paper issued a special edition on the tour, copies of which were presented the Hoosiers 5 miles out of town. At Ellis, Kan., a town of 5,000 people, the tourists had their first taste of real camping out. The tents, which each car carried, were pitched in the city park and during the night a terrific storm struck them. The guards which had been posted hardly had time to warn the campers, few of whom reached the shelter of their cars before they were soaked.

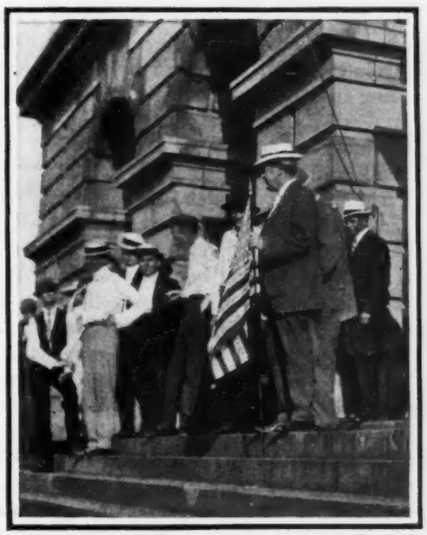
Burlington, Colo., formed the next night's stop. Before reaching town the tourists were met by a band of forty yelling cowboys, their first equine escort. They also were met by a party from Denver representing the Midland trail and headed by J. O. Boak, the man who came from Denver to Indianapolis in the spring and induced the officials of the tour to include the Midland trail in their itinerary. The cowboys led the way to the fair grounds and then gave an exhibition of cowboy races and broncho busting that opened the eyes of the tourists. The latter reciprocated by a parade around the ½-mile track, while McKay White, of the Marion, who is tour chairman, gave a dissertation on each of the cars for the benefit of the Hoosiers' hosts. The parade, before it was finished, almost become a track race, with nineteen contestants. In the evening the guests were treated to a cowboy dance and turkey-trotted in true western style. As there were only five hotels, of about four rooms each, in the town, half of the tourists pitched tents for the night.

From Burlington the Hoosiers proceeded the next day to Colorado Springs, halting for lunch at Limon. At Colorado Springs they were overwhelmed with entertainment and had to neglect much that had been arranged. The festivities started with a banquet which lasted all evening and at which great enthusiasm was shown for both the tour and the Lincoln highway. The next day trips were made to the Garden of the Gods, Crystal park and Ute pass. Manitou Springs was visited and Pike's peak scaled. The run up Ute pass was made in local cars with the exception of Harroun and his party, who drove the Henderson, which has come all the way on kerosene. The pass is said to be 11,000 feet in altitude, and Harroun finds that his kerosene carbureter shows even better results from coal oil in the higher altitudes than in the lower ones. This, he believes, is due to the lower vaporization point of the fuel on account of the decreased atmospheric pressure.

From Colorado Springs, the run was made to Denver this afternoon under the guidance of pilots from the Denver Chamber of Commerce, the Denver Motor Club and the Colorado Automobile Club. At the steps of the capitol building Governor Ammons presented state and national flags



GANG PLOW WITH PREMIER MOTOR ENCOUNTERED BY PATHFINDER



GOVERNOR DUNNE OF ILLINOIS PRESENTS FLAG TO TOURISTS

to the visitors and expressed his intention of accompanying the tour to the Utah line.

A number of trips to show points about the city and its environs have been arranged for tomorrow. The chief event is the luncheon at which the tourists will be guests of the Midland Trail Association, and the governor and mayor speak, as well as Carl Fisher, C. A. Bookwalter and A. L. Westgard, the veteran pathfinder. A definite decision on the routing for the Lincoln highway through Colorado is expected to be reached. Denver's entertainment will terminate with an illuminated parade of the tourists, followed by a smoker.

Sunday the motorists leave for the 91-mile trip to Hot Sulphur Springs, following the Midland trail and crossing the continental divide over Berthoud pass, nearly 12,000 feet above sea level.

Change Tour Itinerary

Denver, Colo., July 12—Reports from Nevada and Utah indicate that the treacherous Fallon Sinks near Fallon, Nev., are full of water, and that it will be impossible to cross them on account of the cars miring down. Consequently it was decided last night to change the itinerary between Ely and Carson City. The new route goes through Goldfield and Tonopah, cutting out Eureka, Fallon and Reno. It is a trifle longer than the original route, but can be negotiated in the 3 days allotted to the other run.

Word was received today by McKay White, chairman of the tour, from A. G. Batchelder, chairman of the executive committee of the American Automobile Association, that both he and Laurens Enos, president of the A. A. A., would join the tourists at Lake Tahoe, Cal. They are accompanying the A. A. A. migration from St. Paul to Glacier Park and will join the coast tour at its completion.

Of the twenty cars that left Indianapolis on July 1, nineteen checked in at Denver, the only one to withdraw being the Stutz, which was called in at St. Louis on account of the death of Harry Martin, the Stutz driver, at the speedway. The other cars have come through with little difficulty so far, the chief embarrassments being tire troubles, and few of those. Some drivers have found carbureter adjustments necessary on account of the altitude.

Hard Test for Pathfinder

The two cars, which are competing under freak conditions, are coming through with flying colors. The Pathfinder, which is running under a bonnet sealed by the chief of police at Indianapolis and is driven by Robert Spiegel, is carrying A. L. Westgard, official A. A. A. map-maker. This car has been used by the veteran pathfinder in three transcontinental trips before this tour. So far Speigle has been able to come through without the necessity of adjustments which require work under the hood, and hopes to present his car with virgin seals to the governor of California, who will break them at the end of the run.

National Tour Now Being Contested

Ten Out of Eighteen Perfect on Fourth Day

LIST OF STARTERS IN THE NATIONAL RELIABILITY

No.	Entrant	Place	Car	Load	Driver
1	L. W. Hill	St. Paul	Packard	2	L. W. Hill
2	L. H. Fawkes	Minneapolis	Premier	2	Bohn Fawkes
3	F. C. Legg	Minneapolis	Stutz	2	F. C. Legg
4	L. H. Fawkes	Minneapolis	Marmon	4	M. Bass
5	G. H. Viter	Boston	Metz	2	L. Cathcart
6	Charles Metz	Waltham, Mass.	Metz	2	John McGann
7	C. Walter Metz	Waltham, Mass.	Metz	2	Luke Sherwood
8	N. W. Automobile Co.	Minneapolis	Krit	2	M. J. Mulleavy
9	N. W. Automobile Co.	Minneapolis	Krit	2	A. A. Hansen
10	N. W. Automobile Co.	Minneapolis	Krit	2	F. A. Witt
11	Dr. C. A. Smith	Devil's Lake, N. D.	KisselKar	2	Dr. Smith
12	L. C. Erbes	St. Paul	Velie	5	L. C. Erbes
13	Walter Hill	St. Paul	Packard	4	Walter Warren
14	R. W. Munzer	Minneapolis	Hupmobile	4	C. I. Munzer
15	W. W. Munzer	Minneapolis	Hupmobile	4	E. E. Alfred
16	E. B. Stimson	Minneapolis	Little	2	E. B. Stimson
17	J. A. O'Brien	Minneapolis	Moon	2	J. A. O'Brien
18	E. A. Everett	Waseca, Minn.	Locomobile	5	E. A. Everett
19	C. A. Van Duzee	Minneapolis	Chalmers	5	C. E. Van Duzee
20	Dr. J. D. Park	Duluth, Minn.	Locomobile	4	Dr. Park
		NON-CONTESTANT			
	W. M. Combs	Sidney, Mont.	Chevrelet	4	W. M. Combs
	S. A. Ingersoll	Galesburg, Ill.	Premier	5	H. G. Ingersoll
		OFFICIAL CARS			
	President's car		Winton		John Johnson
	Pilot car		Mitchell		Frank Zirbes
	Pacemaker		Mitchell		R. C. Smith

By J. E. Smith

FARGO, N. D., July 12—Strenuous in the extreme was the first leg of the ninth national reliability run of the American Automobile Association ending tonight. Until Monday the tourists will enjoy a much-needed rest aboard the Great Northern hotel train.

The tour started at 8:30 o'clock of the morning of July 11 from the Automobile Club of Minneapolis. It will end Saturday afternoon, July 19, at Glacier Park Station, Mont.

Tour Starts in Rain

Starting in a driving rain the morning trip to St. Cloud the first day was a slipping, slewing, sliding drive testing the nerve of pilots and the efficiency of the twenty-six cars who are in to the finish. The roads were soft and slimy the first half day and as bad in the afternoon up to the night stop at Alexandria. At noon the time was lowered 2 miles an hour and the reduced schedule was maintained today.

Today's morning run was in a hard rain to Fergus Falls, but this afternoon a west wind sprang up, dried up the gravel roads and the first enjoyable stretch was enjoyed.

A newly-made road across deep cuts resulted in the ditching of the Mitchell Moose pathfinder twice, a Little car and a Premier entry from Galesburg today, and in numerous carbureter and magneto troubles from water. The Kissel entry broke a front spring leaf today and the Paige press car was a close second with similar injury. A. G. Batchelder, riding in the president's car—a five-passenger Winton—with Laurens Enos, of Buffalo, was thrown suddenly against a top rib and rendered unconscious for several minutes. Similar accidents were common.

The first 2 days' drive was a remarkable test for pilots. Notwithstanding the road trials, which varied constantly with the character of the soil, plowing against pelting rain and guarding against slipping from the road, which in long stretches was little wider than the car treads, with ditches on both sides, accidents were rare.

Many veteran drivers are in the tour, and several distant entrants, including C. H. Metz and C. Walter Metz, of Waltham, Mass., makers of the Metz cars, and G. H. Viter, of Boston, entrant of a third Metz. These are the only friction-driven cars in the run. The tendency in this tour for short-base cars, including runabouts and four and five-passenger touring cars, has proved satisfactory, as they have held the roads better and are in less danger in wet weather than the heavier touring cars.

Run Christened a Voyage

The ninth annual reliability run to date has been called a voyage by the contestants. Referee C. E. Dutton, who is also chairman of the touring board, suggested decoy ducks instead of confetti. The best result aside from showing the sturdiness of the cars taking part as entrants, official machines and non-contesting, has been to demonstrate the fallacy of the common idea of road building in the state up to the present time, and to show the value of good road making in counties that have approached scientific interests in their road work. The tour is already pointing out to the people along the route—which thus far is the northern official transcontinental route of A. L. Westgard—the necessity for further improving roads so as to attract the touring public. Great improvement over the routes as they have been toured in former state and city motor runs is

shown to the veterans. Another expectation is that the entry of three runabout teams and several individual entries in the same class will advertise the fact that the manufacturers on the inside are playing strong to popularize this type of car as most feasible for the general country dweller's use.

The feature of the present tour, aside from the attendance of two executive officers of the A. A. A. and the presence as passengers of C. C. Lake, sales manager for the Premier company, and Frank Mooney, publicity manager for the Hupp Motor Car Co., is the hotel train of twelve Great Northern cars, including dynamo, welding and newspaper, engraving and photograph car, and the perfect array of sleeping, observation and dining cars.

The Hotel Train

Formality is barred. When the tourists reach a control they go immediately to the dining cars for their luncheon. At night the performance is repeated for dinner and the night rest. The train, carrying passengers who drop out of the cars for a day or half day, reaches the stations first. The controls are at the stations and the referee has no trouble in keeping track of everybody, because the hotel is headquarters at all times. Every night a copy of the Glacier Park Blazer is laid at the plates in the dining car. It contains the photographs and news of the day. It is set up and printed and the engravings are all made on the train.

Penalties for the first 2 days for late arrival only, announced partially tonight by Referee Dutton, are as follows:

Car and Driver.	Points.
Little, Stimson	82
Krit, Hansen	70
Krit, Mulleavy	9
Velie, Erbes	7
Hupmobile, Munzer	1

Tour Reaches Grand Forks

Grand Forks, N. D., July 14—Special telegram—Half of today's run in the ninth national reliability run, Minneapolis to Glacier Park, was over soft, recently wet gumbo roads. The second half was mainly over gumbo and gravel roads that had been dried in the parching wind blown since the rain stopped. The Mitchell Moose pilot dropped out early to repair an auxiliary pressure pump and the confetti was transferred to the Paige-Detroit press car. On arrival here the Mitchell was found to have a bent and slightly cracked steering knuckle and a broken foot pedal. These, with several broken windshield holders and the broken frame of No. 3 Stutz were repaired in a few minutes each by the Vulcan process outfit on the train. One Metz car broke a front spring.

Many stops for water were recorded for the morning run. The afternoon schedule was cut to 16, 14 and 12 hours in expectation of trouble, but the running was the best yet.

Dr. E. W. Humphreys, Moorhead, Minn., added a Velie tourabout as No. 17 entry early today and will go through. A Luverne touring car fell in line as escort through North Dakota today.

They are entranced with the North Dakota scenery and prospects. It has been discovered in this tour that roads are perfect in dry weather but slippery after rains for 24 hours. The roads are well posted by trail associations thus far.

Ten Perfect Fourth Day

Minot, N. D., July 15—Special telegram—With Glacier Park Station, the terminus of the national reliability tour, now only 4 days away, ten of the eighteen contestants can boast of perfect scores, although today's drive proved one of the most strenuous of the trip so far.

Although twenty contesting cars checked out of Minneapolis Friday morning, the field has been reduced to eighteen, C. A. Van Duzee withdrawing the No. 19 Chalmers and L. W. Hill's No. 1 Packard becoming a non-contestant today. The ranks of the non-contestants were further swelled by the entry of a Ford and Chalmers at this control.

The fourth day of the migration across four states was unfortunate for several competitors. Fifteen points were charged against the No. 11 Kissel for running through a special control at Crookston and the No. 3 Stutz received 47 demerits for being 50 minutes late at the noon control. The Stutz broke both front springs today, one in the morning and the other in the afternoon.

The No. 7 Metz broke a wheel on a short turn 31 miles out from Minot but by replacing with a spare wheel, checked in on time. The Chevrolet, a non-contestant, broke a cone on the front bearing. The driver was picked up by another car and taken to the noon control where he secured another cone. He returned to his disabled car on a freight train and is now on his way to Minot.

Today's run was fine. The weather was hot and at times the sand was terrific but not impassable.

Referee Dutton will suggest to the A. A. A. contest board that the grade 4 rules be amended so that cars may be checked out at the city limits or a short distance from the control, thus avoiding confusion in checking drivers who have apparently arrived on time but who are working on their machines.

First American Cyclecar Event Carded

Little Machines Asked to Go Around Lake Michigan

CHICAGO, July 15—Cyclecars will participate in the around-Lake-Michigan reliability contest of the Chicago Motor Club, running in a special class, if present plans carry and the makers of the new class of cars show sufficient faith in their product to enter their tiny vehicles for the event. These small cars are capable of great speeds on good roads, but on the class of roads to be met with in the run around Lake Michigan the cars will show what they can do on roads of the worst as well as the best sort.

Correctly designed with good springing and low center of gravity, there is no reason why the cyclecars cannot make the run even this early in the stage of their development.

In the classification of the cars the European definition of the cyclecar will probably hold, this limiting the competing cars to a cylinder capacity of 1100 cubic centimeters—67 cubic inches—and the stripped weight to 672 pounds. Each car will have to carry two people, the driver and observer, although if single seaters are produced by the time of the run special provision may be made for them. Entry will be $15, and a special trophy will be offered.

The cyclecars will compete in the run with big cars but will be required to make but 75 per cent of the speed between controls; that is if the big cars run on a 20-mile schedule the cyclecars will be required to make but 15 miles, but the controls will be the same. There will be no checking of the motors, however, as to non-stop performances as there has been so little time for the real development of the new vehicles that the Motor club does not wish to handicap the cars in any way so long as they make the trip in a creditable fashion. Lateness at controls and road repairs, outside of tires, will of course be penalized.

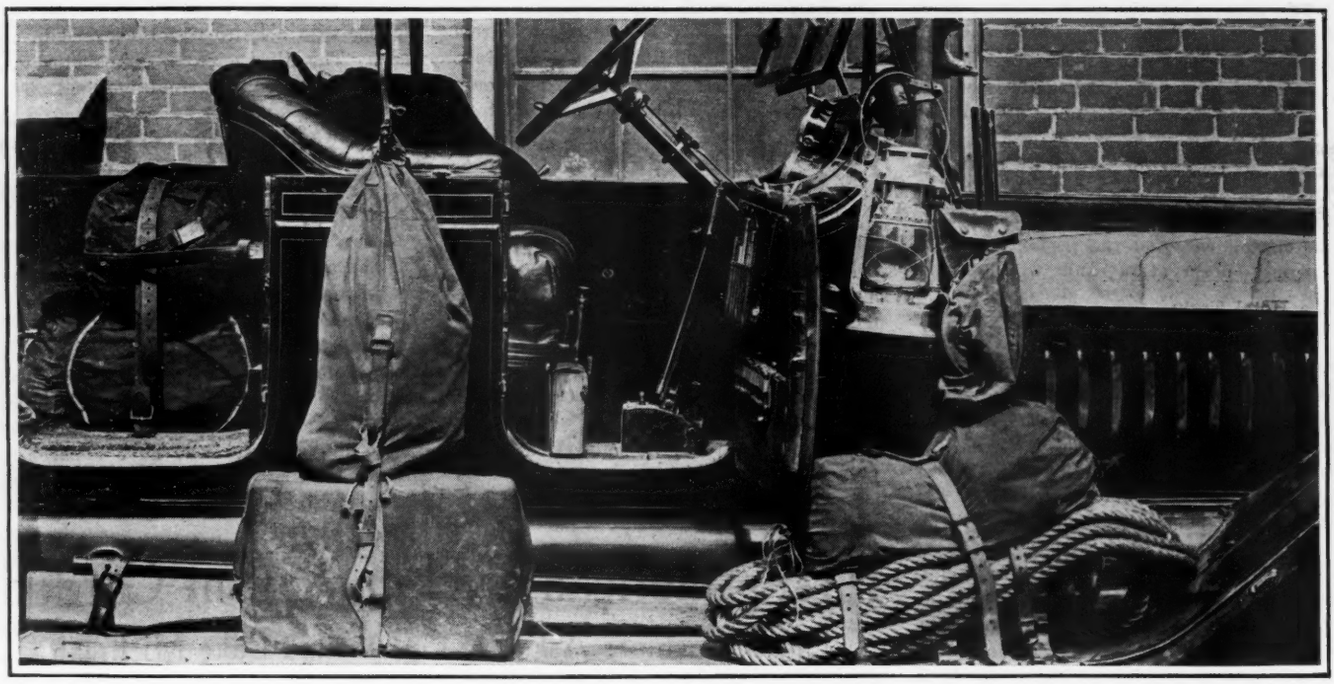
This will be the first case of a sanctioned cyclecar contest in America and the first official recognition of the definition of a cyclecar this side of the water. The opportunity for the maker to try out his new machines will have possibilities of exceptional publicity, and he can count on the fact that no maker of the new vehicles in this country is any further advanced in the perfection in time than he. All makes are new this year.

It is possible that entries will be had of the Imp cyclecar, of Auburn; the Autoette, of Chrisman, Ill.; the Economycar, of Indianapolis; the Grant of Detroit; the De Cross Cy-Car, of Cincinnati; the California Cyclecar, of Los Angeles, and the American Cyclecar Co., of Detroit.

NOVEL CONGRESS SCHEDULED

New York, July 16—Special telegram—The American Museum of Safety will hold the first international exposition of safety and sanitation in America between December 11 and 20, inclusive. Exhibits relating to safty, health, sanitation, prevention, welfare, etc., will be made. European exhibits will be admitted free of duty by a special act of congress.

Routes and Touring Information



THE Premier used by A. L. Westgard, the veteran trail-blazer, is considered the last word in a car for transcontinental and long-distance touring. Clothing and provisions are packed in waterproof sacks of tarpaulin and strapped in the tonneau or on the running board. The pathfinder also carries 200 feet of strong rope to be used as a tow line and a farm lantern that comes in handy at night when sign posts must be inspected and roads examined. On the fore door is a leather case for pencils and another for cartridges and a flag staff socket has been riveted on the rear fender.

Three-Thousand Mile Jaunt at Cost of 5 Cents Per Mile

TO those skeptical persons who are unwilling to be convinced that meter travel is cheap as compared with the railroad, the expense items incident to a 3,000-mile trip of I. C. Emerson are submitted in support of the contention that it does not cost a fortune to tour in a motor car. Driving a 30-horsepower Overland, this enthusiastic motorist covered approximately 3,000 miles in California and Oregon at a total expense of $150.

Mr. Emerson is proud of his car. He takes pride in keeping down his maintenance in operating bills. In this respect he has been very successful and declares that all other motorists can do likewise if they will exercise proper discretion in driving.

There were six people in the Emerson party, including Mrs. Emerson, Mr. and Mrs. H. Black and their two children. It is worthy of note that on this 3,000-mile journey they were not particular as to what roads they traversed. They selected their routes at random, paying attention only to the interesting points to be seen in the southern states. In many instances they went to places where the railroad does not penetrate.

Considering the number in the party, Mr. Emerson, whose home is in Dalles, Ore., made an enviable record. Five cents a mile for six persons is pretty cheap for a continuous jaunt of 3,000 miles. This is a record of which Mr. Emerson is proud and believes never has been bettered under like circumstances.



PREMIER FLAGSTAFF SOCKET

"It is absurd to think that you have to be wealthy to tour around the country in a motor car," says Mr. Emerson. "As long as one is careful driving over the rough roads one naturally encounters on an extensive trip, it can be done cheaply. My expense of $150 covers everything—tires, inner tubes, gasoline, oils, garaging and team hire for being hauled out of the mud on two occasions.

"We went all over California—every place that looked interesting was our goal. We started in at San Francisco, and hardly before we knew it we were in Tia Juana, Mexico, having traversed more than half the length of this long state. Time flies swiftly when one is in a strange clime and always heading for an interesting spot. There are so many places rich in romantic and historic lore in California that the visitor's time is well taken up.

"The numerous advantages in owning a good motor car is illustrated when one wishes to take such a vacation. With the motor car you are not dependent upon the railroads. You can select almost any place you wish to go to and head for it,

regardless of time tables, junctions, railroad fare and the like. I find that it is much cheaper, when capacity load is carried, to travel by motor. Then, too, you are given much better opportunity to observe the country and its people, to appreciate the scenery and understand what you are seeing.

"Most of California's roads are model ones. The beautiful boulevard around Los Angeles and San Francisco fill the motorist's heart with delight. You can go for miles and miles along the wide paved broadway in northern California and never shift from high. The Californians are specially progressive in this regard, and in consequence have built up an enormour motor tourist trade. The money that pours into the Golden State through its system of fine roads pays a big return on the money invested in improved highways.

"I take pride in keeping down the cost of running my Overland. I drive it on the principle that if it is given the proper attention it is a good investment. It would be an extravagance if I used it recklessly, driving at any old speed over any kind of a road, and never caring an iota about the bills.

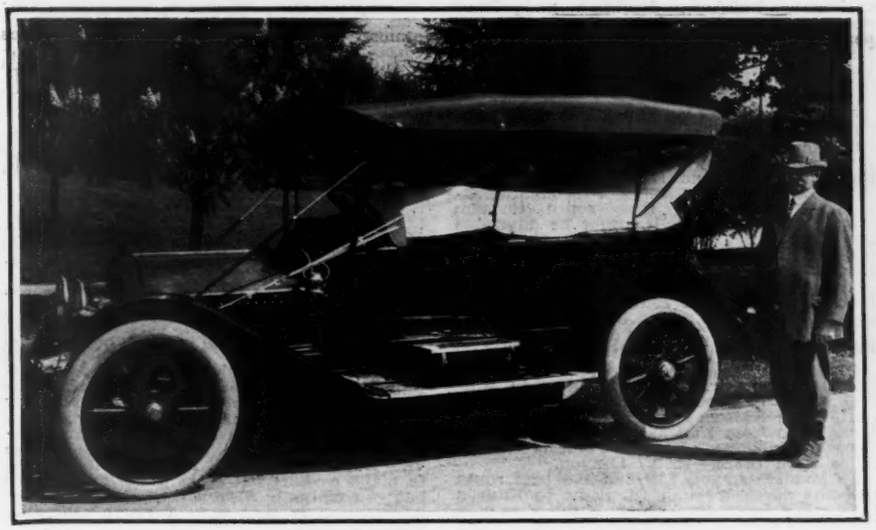
"I often have heard business men and those who ought to know better say that the motor car is a big luxury. It may be for some, but I never have found it to be a fact. I know, for instance, that I can run a car at a maximum cost of 5 cents a mile when it is loaded to its capacity. That's a great deal cheaper than paying railroad fares."

Mr. Emerson drove from Tia Juana through to Portland. Arriving at the latter place, he drove back to The Dalles. Going to California, he shipped to The Dalles and took the central Oregon route to California. He followed the Pacific highway on the return trip.

BED FOR MOTORISTS

Dr. R. L. Bradley, of Tacoma, Wash., has recently applied for a patent on a motor bed designed to convert any five or seven-passenger car into a veritable Pullman sleeper in a few minutes. When not in use, the bed folds into a small roll and can be tucked away in the locker under the rear seat, completely out of sight, and the stretching device—long bars 4 feet 4 inches in length—finds a place under the running board.

"The key to the invention was the use of slanting rods for the back, the lower end of which was placed firmly in the corner between the floor of the rear of the car and the back of the front seat, the upper ends reaching to a joint just behind the tonneau," says Br. Bradley. "The front supports are placed upon the bottom of the front seat with the cushion removed. The bed itself is of heavy canvas, with a hem at each end, through which runs a stretcher bar. The supports fasten on to these stretcher bars and the bed is held in place firmly by attaching the rear supports by ropes to the rear springs, and the front supports in a like manner to the front springs. A set of pulleys on each of the front ropes stretches the bed so tightly that it cannot sag. Thus the weight is all placed upon the springs of the machine and upon the floor of the car. No part of the bed touches the tonneau of the machine, or any finely polished portion.



MOTOR BED INVENTED BY DR BRADLEY OF TACOMA

"Later I improved the bed by placing springs on the front ropes, as will be noticed from the illustration of the bed. With these springs the bed is more comfortable than any other bed in which I ever have slept. The use of the pulleys every time the bed is used gives new tension and spring. The slanting posts in the rear permit of a vertical vibration, whereas the ordinary bed is soft only in the middle and your head and feet are upon rigid boards. This simple bed conforms to the contour of the body all the way along."

The width of the bed used at present is 54 inches, which is ample for two persons, with room enough to tuck in a child, besides. Even after the bed is set up and the curtains drawn around the machine, there is ample room in front of the forward seat for the family to undress.

In addition to the patent on the bed shown in the accompanying illustration, a patent has been applied for on a second patent on a bed which is not supported by ropes, but is simply stretched on a frame and supported by legs which foot on the front and rear seat and attached to the tonneau and front seat, and will be found superior for runabouts and small machines.

Answers to Many Route Inquiries

Ashton, Ill.-Ute, Ia.

ASHTON, Ill.—Editor Motor Age—Please give me the best route from here to Ute, Ia., returning by way of Schaller, Havelock, Mason City, Sumner, Manchester and Dubuque. Mention any special points of interest en route that might be reached without taking us too far from our course or take us away from good roads.—E. C. Gould.

Going west from Ashton you follow the line of the Illinois Transcontinental route to Clinton 58 m., passing through Dixon, Sterling and Morrison; from Clinton follow the Iowa division of the transcontinental route to Cedar Rapids 88 m., passing through Dewitt, Clarence, Mechanicsville, Mt. Vernon and Marion. Cedar Rapids to Marshalltown 76 m., via Belle Plaine and Gladstone, through the northern edge of Tama and the Indian reservation at Montour; Marshalltown to Denison 142 m., via Nevada, Ames, Boone, Grand Junction, Jefferson, Carroll and Westside. Denison to Ute is 25 m., via Charter Oak.

Returning you can either come back to Denison and then go straight north to Storm Lake through Schaller, or you may find it perfectly feasible to go on a direct line to Schaller, which is about 40 m. from Ute, passing through Ida Grove. From Schaller go to Sioux Rapids 33 m., via Storm Lake and Truesdale. Havelock is 27 m. east of Sioux Rapids, passing through Marathon and Lorenz.

Continuing on your trip from Havelock we believe you will find it necessary to come east through Rolfe and Gilmore to Humboldt, in order to get across the river at this latter point. From Humboldt go north to Algona 25 m. on almost a straight road; Algona to Mason City is 56 m., along the route of the North Iowa pike, passing through Wesley, Britt, Garner and Clear Lake; Mason City to Waterloo is 81 m., via Rockford, Greene, Clarksville and Janesville; from Waterloo to Dubuque is 91 m., via Jessup, Independence, Manchester, Dyersville and Farley. You will find the last few miles of this route into Dubuque very scenic, with long downgrades, offering exceptional fine views over the Mississippi Valley.

From Dubuque you can come down to Clinton 72 m., via Maquoketa and from there direct to Ashton through Sterling, or you can come east from Dubuque to Rockford 95 m., via Hazel Green, Shullsburg, Warren and Freeport; and from Rockford to Ashton via Rochelle, although all these routes are quite hilly on the first part of the way, but they offer many excellent views of surrounding country. We feel sure, however, you will find better road conditions and it is shorter to come by way of Clinton.

Cisco, Tex.-Palacios, Tex.

Cisco, Tex.—Editor Motor Age—Please mention the best route to Palacios, as I want to avoid all the sand that I can and want the best route.—H. Carioderee.

Motor Age is not able to give you absolute road conditions you will find on a route directly east towards Hillsboro or Waco, although this may be possible following along the line of the railroad through Gorman, DeLeon, Dublin, Hico and Meridian. We feel sure, however, from our information that you will be safe in going east about 120 m to Ft. Worth, following the line of the railroad through East Lynn, Strawn, Gordon and Weatherford. From Ft. Worth go south to Waco 140 m following the direction of the Meridian road through Crowley,

Cleburne, Rainbow, Meridian and China Springs. From Waco believe you will find it best to go clear into Houston 220 m through Marlin, Hammond, Hearne, Bryan, Millican, Courtney, Hempstead, Waller and Fairbanks. The distance from Houston to Palacios is about 110 m.

You will undoubtedly find the best road by going southwest through Missouri City, Richmond, Rosenberg and Wharton. Here turn south following along the railroad through Magnet and Harrows to Bay City. From Bay City go west again through Markham and Midfields; then south through Blessing to Palacios. It might be advisable for you to inquire at Wharton about the feasibility of getting across the Colorado River just west of Bay City. It may be better to cross at Wharton to El Campo and then almost straight south to your destination.

Kansas City, Mo.-Mineral Point, Wis.

Pittsburg, Kan.—Editor Motor Age—I expect to take a trip in my machine to Mineral Point, Wis., and would like to have the route from Kansas City. I thought possibly I might go from Kansas City, north through Iowa to Dubuque. Mineral Point is only 40 miles from there.—E. V. Lanyon.

As you state, you will find the best route to come north through Ft. Scott to Kansas City. We infer from your letter that you know this part of your route. From Kansas City recommend your going to St. Joseph, Mo., 83 m., via Leavenworth and Atchison. Part of this road has been macadamized, but we understand it is rather rough in some places due to heavy travel. The dirt roads at this season of the year should be in very good shape. From St. Joseph go direct to Des Moines, 183 m., via Stanbury, Grant City, Mt. Ayr, Afton and Winterset; from Des Moines recommend your following the River-to-River road to Newton 37 m., via Colfax; and from Newton go north to Marshalltown 32 m., via Laurel; from Marshalltown go to Waterloo 58 m., via Conrad, Grundy Center and Rheinbeck.

From Waterloo go almost straight east on the Hawkeye highway to Dubuque 91 m., passing thru Jessup, Independence, Manchester, Dyersville and Farley. Mineral Point is 50 m. from Dubuque. You will find a fairly good road, although quite hilly, via E. Dubuque, Fairplay, Cuba, Platteville and Calamine.

Complete running directions on this route are given in Volume 5 of the Blue Book.

Piqua, O.-Washington, D. C.

Piqua, O.—Editor Motor Age—Please give me a route to Washington, D. C., via Wheeling, W. Va. In what condition is the National pike? Please publish route before July 21st as I want to start at that time.—S. N. Arni.

Recommend your going south from Piqua to Vandalia 19 m. through Troy. At Vandalia turn east on the National road to Columbus 65 m.; pass through Forgy, Springfield, Vienna, Brighton and Alton. From Columbus instead of following the National highway into Painesville, believe you will find better roads at present, due to heavy travel on National road, by going to Zanesville 60 m. via Columbia Center, Granville, Newark and Hanover; from Zanesville follow the National road to Wheeling 72 m., passing through Cambridge, Elizabethtown, St. Clairsville and Bridgeport. Some stretches of this road are a little bit worn and rough, but for the present it seems to be the best route into Wheeling.

From Wheeling to Pittsburg 61 m. via West Alexander, Washington and Carnegie. You should continue on the old National Highway as far as Cumberland, but that section from Cumberland to Hagerstown is in very bad shape at present, although they are working on it this summer and you will find it advisable to drop down south to Winchester or North to Bedford from Cumberland.

Pittsburg to Bedford is 97 m and is in the best shape that it has ever been for this summer. The main route is via Wilkinsburg, Irwin, Greensburg, Ligonier, Jennerstown and Schellburg.

Bedford to Gettysburg, 80 m via Everett, McConnellsburg, Chambersburg and Cashtown. From here to Washington the best route is 78 m via Lewistown, Frederick, Clarksburg and Rockville.

Olustee, Okla.-Pilot Point, Tex.

Olustee, Okla.—Editor Motor Age—Kindly give me a good route from Olustee, Okla., to Pilot Point, Tex. Would like to cross rivers on a bridge.—W. R. Kent.

Motor Age has been unable to find out positively whether you can get across the Red River either at Elmer or Hazel. It should be possible at Elmer and if you can cross by bridge or ferry and go to Chillicothe, you will find very good roads following along the line of the Ft. W. & D. through Vernon, Harrold, Electra, Iowa Park to Wichita Falls 65 miles; from Wichita Falls go to Decatur 81 miles via Henrietta, Bellevue, Bowie and Alvord; from Decatur go almost straight east to Denton 25 miles through Stony and Krum; and from Denton go northeast to Pilot Point about 18 miles through Mingo and Aubrey.

Lincoln, Neb.-Scottsbluff, Neb.

Lincoln, Neb.—Editor Motor Age—Kindly inform me as to the best route between Lincoln and Scottsbluff, Neb. Trip to be taken in September.—Interested Reader.

You will find very good dirt roads practically all the way to Scottsbluff. There may be a few stretches of sand, but these are being constantly improved and latest reports are that tourists are not having any difficulty.

Lincoln to Grand Island, 99 m; very excellent dirt road, passing through Seward, Utica, Waco, York and Aurora; Grand Island to Kearney 45 m through Wood River and Shelton; Kearney to Julesburg, 206 m via Lexington, Gothenburg, North Platte, Paxton, Ogallala and Brule; Julesburg to Kimball, 80 m. via Chappell, Lodge Pole, Sidney and Potter. You will note that all the way from Grand Island you follow the Union Pacific. This is also a section of the Platte Valley transcontinental route. It is possible to make a short cut from Brule to Chappell but you will only save a few miles and local information is that it is a rough and hilly road.

Scottsbluff is almost straight north from Kimball about 50 m through Harrisburg and Gering. We received information only the other day that the road from Kimball to Scottsbluff was very good.

Temple, Tex.-Maysville, Ky.

Temple, Tex.—Editor Motor Age—Please give me the best route to Maysville, Ky.—J. S. McCelvey.

From Temple go to Waco 53 m., via Pendleton, Moody and McGregor; from Waco to Ft. Worth is 140 m., via China Springs, Clifton, Meridian, Walnut Springs, Bona, Clebourne and Crowley. This is a section of the Meridian road; in fact, you will follow the various divisions of the Meridian road north as far as Newton, Kans.

Fort Worth to Wichita Falls 124 m., via Decatur, Bowie and Henrietta; Wichita Falls to Lawton 60 m., crossing the Red river at Burkburnett, passing through Randlett and Emerson; Lawton to El Reno 113 m., via Apache, Stecker, Virden and Chickasha; Lawton to El Reno to Wichita 184 m., via Hennessey, Enid, Jefferson, Medford, Caldwell and Wellington; Wichita to Newton 26 m. This is almost a straight road, only one or two turns in the towns. At Newton you turn east and follow the New Santa Fe trail to Emporia 83 m., passing through Peabody, Florence, Clements and Cottonwood Falls. Emporia to Kansas City is 134 m., via Williamsburg, Ottawa, Edgerton, Gardner, Olathe and Martin City.

For mileages in towns passed through between Kansas City and Indianapolis see the Tulsa to Parkersburg reading.

From Indianapolis go to Cincinnati 119 m., through Fountaintown, Arlington, Rushville, Connersville, Everton, Brookville and Harrison; Cincinnati to Maysville, 70 m., is an old stone pike on the south side of the Ohio river, but last fall it was in good condition, going through Covington, Alexandria, Grant Licks, Brooksville and Germantown.

Complete routing on this is given in Volumes 4 and 5 of the Blue Book.

Dallas-Mineral Wells, Tex.

Daingerfield, Tex.—Editor Motor Age—Please give me the best route from Dallas to Mineral Wells; Mineral Wells to Orange by the way of Houston and from Houston to Galveston.—J. Bradfield.

From Dallas go to Ft. Worth 33 m. and from Ft. Worth to Mineral Wells 70 m via Weatherford, Adell and Whitt. For Houston you will find it advisable to return to Ft. Worth and go from there direct to Houston via Waco and Bryan. For mileage and towns passed through see Cisco to Palacios routing.

Houston to Galveston, 52 m. This is modern improved road, practically all the way through South Houston, Genoa, Webster and Dickinson. In going to Orange from Houston we are not so sure about road conditions, especially on the latter part of your trip, but believe it is perfectly feasible and recommend your following the line of Southern Pacific to Beaumont, 85 m. through East Houston, Crosby, Dayton, Liberty, Devers, Nome and Pine Island. Orange is straight east from Beaumont about 25 m.

Tulsa, Okla.-Parkersburg, W. Va.

Tulsa, Okla.—Editor Motor Age—Please give me most direct route to Parkersburg, W. Va., also inform where I can get guide books for this trip.—F. M. Bohn.

Come almost straight north from Tulsa to Cherryvale, Kans., 110 m., via Claremore, Nowata and Coffeyville; from Cherryvale continue north to Ottawa, Kan., 112 m., passing through Earlton, Chanute, Humboldt, Tola, Garnett and Richmond; from Ottawa go direct to Kansas City 71 m., following the new Santa Fe trail through Edgerton, Olathe and Martin City. From Kansas City your route is almost directly east to Columbus, first going to Columbia, Mo., 159 m., via Independence, Lexington, Marshall and Boonville; Columbia to St. Louis 141 m., via Fulton, New Florence, Warrenton and St. Charles; St. Louis to Terre Haute 173 m., via Collinsville, Greenville, Vandalia, Effingham and Marshall; Terre Haute to Indianapolis 70m., via Brazil and Reelsville; Indianapolis to Columbus 176 m., via Greenfield, Richmond, Eton, Dayton and Springfield. This route from St. Louis follows the line of the old National highway and is very direct with very fair road conditions, especially after crossing Illinois.

Columbus to Parkersburg is 113 m., passing through Carroll, Lancaster, Logan, Nelsonville and Athens.

Volume 5 of the Blue Book will give you complete running directions from Cherryvale, Kans., to St. Louis, and Volume 4 the rest of the way on your trip to Parkersburg and return. These can be secured from the Automobile Blue Book Publishing Co., Chicago.

Pittsburgh, Pa.-Niagara Falls, N. Y.

Grafton, W. Va.—Editor Motor Age—Please give me the most desirable route for a trip to Niagara Falls. I do not want necessarily the most direct route, but the one that offers the most attractions in the way of good roads, sight-seeing, etc.—H. C. Compton.

From Pittsburgh to Niagara Falls it is possible to go by two almost totally different routes. Briefly, one is almost straight north to Mercer and Meadville to Erie and then along the Lake Shore route to Buffalo, and the other is on a more direct line through Jamestown, N. Y. This latter we recommend, as we believe, although a hilly route for the most part, it is very scenic and gives you an excellent opportunity to take in Chatauqua Lake.

Pittsburgh to Jamestown is 168 m., going via Bakerstown, Saxonburg, Butler, Rimersburg, Reesburg, Clarion, Marionville, Sheffield and Warren. At Jamestown you can go direct to Buffalo 72 m., via Kennedy, Cherry Creek, Dayton and Collins, although we recommend you going to Westfield 27 m., following along the northeastern side of Chatauqua Lake through Bemus Point and Maysville. At Westfield pick up the well-known shore route for Buffalo 63 m., passing through Brocton, Fredonia, Silver Creek and Evans; from Buffalo to Niagara Falls there is a new boulevard 26 m., leaving Buffalo on Main street. The only town passed through is St. Johnsburg.

Poplarville Miss.-Asheville, N. C.

Millard, Miss.—Editor Motor Age—Please give me the route from Poplarville, Miss., to Asheville, N. C.—S. H. Batson.

We cannot recommend that you will find a fairly good road all the way from Poplarville to Asheville, although it is feasible and on many stretches you will find good macadam.

Advise your going to Mobile, which is about 100 m., via Gulfport, Biloxi and Orange Grove; from Mobile go north to Jackson 74 m., via Mt. Vernon and McIntosh Bluff. It may be possible for you to come on a direct route east from Poplarville to Jackson, although we have no definite information on this. From Jackson go to Montgomery 120 m., via Thomasville, Octagon, Orrville and Selma. Montgomery to Atlanta 182 m., via Tuskevee, Opelika, Langdale, Lagrange and Newnon. At Atlanta you will begin to strike much better road conditions, going to Greenville 188 m., via Lawrenceville, Jefferson, Bowersville, Lavonia and Anderson. Greenville to Asheville direct, 59 m., thru Poinsett's Spring, Tuxedo, Hendersonville and Fletcher.

Bonne Terre, Mo.-Los Angeles, Cal.

Bonne Terre, Mo.—Editor Motor Age—I am going to drive my Reo to Los Angeles, Cal., and will leave here August 1st. Please give me directions as to roads. I am going to carry full camping outfit, and would like some suggestions.—Dr. S. Elliott Woods.

Come north to St. Louis 63 miles via De Soto, Hillsboro and Maxville. From St. Louis follow the official Cross-State highway to Columbia 141 miles, passing through St. Charles, Warrenton, New Florence and Fulton; Columbia to Kansas City 159 miles via Franklin, Booneville, Marshall, Lexington and Independence.

For distances and towns passed through with other details, see July 3rd issue of Motor Age, page 23.

For camping outfit see Motor Age issues of April 3 and May 1 and also write to David T. Abercrombie & Co., New York, for their catalog of camping outfits.

Improvements in 1914 Jesco Starting and Lighting System

JESCO cranking and lighting systems for 1914 show decided improvement over the original designs. The chief changes have been made in the simplification of installation and control features. So far as the actual design of the motor generator is concerned, there is little change, except that the controller which in the original system was separate from the motor generator and mounted in the driver's compartment, now is incorporated as a part of the electric unit. Consequently, the entire mechanism with the exception of the battery now is a unit. This makes the installation of the system very easy and the wiring connection particularly simple.

Another step in the simplification of the system is the adoption of the single-voltage system. The 1914 system operates on 6 volts throughout, instead of the 6-volt or 8-volt lighting and 12-volt or 6-volt cranking used in the earlier design.

Simplicity of wiring connections is shown in Fig. 2. A view of the complete unit is offered in Fig. 1 which shows the controller and switch box mounted as a unit with the motor generator. A feature which makes installation on different cars easy is the fact that the rings carrying the lugs for attaching the unit may be rotated about the unit and placed in any one of four positions. This permits the unit to be mounted upright, upside down or sidewise as conditions may require.

The new outfit weighs about 44 pounds, which is the same weight as the motor-generator alone of the former design. The unit is designed to be mounted on the engine and driven either by a silent chain or gears from the crankshaft. In some cases it may be mounted on the gearset housing and driven from the transmission shafting.

The driving gears and the automatic clutch is incorporated with the starting and lighting unit so that no special arrangements are required. The generator is of the multipolar type, having special field windings that are in service as the starter is acting as a motor or as a generator. When the generator is acting as a motor, a gear transmission in the front of the case in engaged, which increases the gear ratio between the armature of the generator and the crankshaft of the engine, increasing the cranking torque.

When the engine is running, the gear transmission is locked by the action of a centrifugally actuated multiple-disk clutch; then the generator armature has a gear ratio of 2 or 3 to 1 with the crankshaft. No gears are in operation when running as a generator.

Changing from motor to generator automatically is taken care of in the controller. The generator charges the battery, which is a Willard 6-80, at a car speed between 8 and 10 miles per hour. Below that speed there is a slight draw on the battery for the lights; above that speed the generator will carry the lights and also charge the battery. Tests made by the Jones Electric Starter Co., Chicago, the maker of the system, show that ⅛ horsepower is required by the system to charge the battery at a rate of 12 amperes.

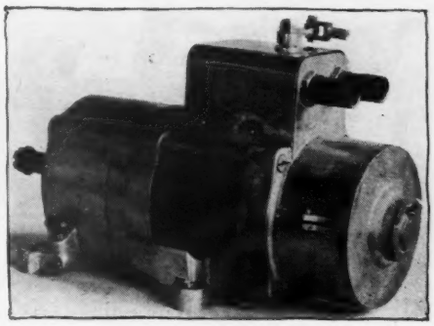


FIG. 1—JESCO CRANKING AND LIGHTING UNIT

The Jones Electric Starter Co. is very closely connected with Roth Bros. & Co., manufacturer of the Roth motors and dynamos. All parts of the Jesco system are made in the two plants.

GASOLINE PRICES IN TEXAS HIGH

Austin, Tex., July 12—It is claimed by Attorney General B. F. Looney that gasoline is being sold in Texas at a profit of nearly 200 per cent. He says that the testimony and evidence in the suit of the state of Texas against the Magnolia Petroleum Co. and other alleged subsidiaries of the Standard Oil Co., in which penalties aggregating $102,000,000 for alleged violations of the anti-trust law are sought to be recovered, show the price of gasoline is abnormally high in this state and all over the country. Since this suit was filed the price of gasoline in Texas has dropped from 20 to 18 cents per gallon Mr. Looney points out.

MILWAUKEE MOTOR FILES SCHEDULES

Milwaukee, Wis., July 14—The Milwaukee Motor Co., Milwaukee, against which an involuntary petition in bankruptcy was filed several weeks ago, today submitted its schedules, which show liabilities of $340,459.92 and known assets of $325,541.36. The assets listed do not include the market value of patents, copyrights, trademarks, etc., which it is believed will more than make up the deficiency between liabilities and assets. The lack of working capital, which is believed to have been the direct cause of the failure, is made apparent by the schedules filed today. Wages due are listed at $12,119.07, while cash on hand amounts to $226.55 and cash in banks and elsewhere is $4.42.

The secured creditors are Alonzo Pawling, Milwaukee, $15,000 for a mortgage note originally given to Martin E. Holcomb, but transferred, and an unknown mortgage on 160 acres of land with a claim of $600.

MORE BUS LINES FOR NEW YORK

New York, July 14—A new scheme of motor bus lines is the latest project proposed to solve the traffic problems of New York. An application for a number of line franchises of the Manhattan Motor Bus Co. is now before the board of estimate, likewise one from the New York Bus Co., one from the Electro-Coach Co., and in addition the Fifth Avenue Coach Co. asked for an extension of its franchise. If all application were granted this city would receive forty lines of motor buses providing easy transportation in all districts and from one to the others. The applications were put through as a result of the recent amendment of the bus act enacted in the legislature as a result of Governor Sulzer's message to the same, advocating the annihilation of the conditions giving the operating monopoly to the Fifth Avenue Coach Co., which has been in operation for some time past.

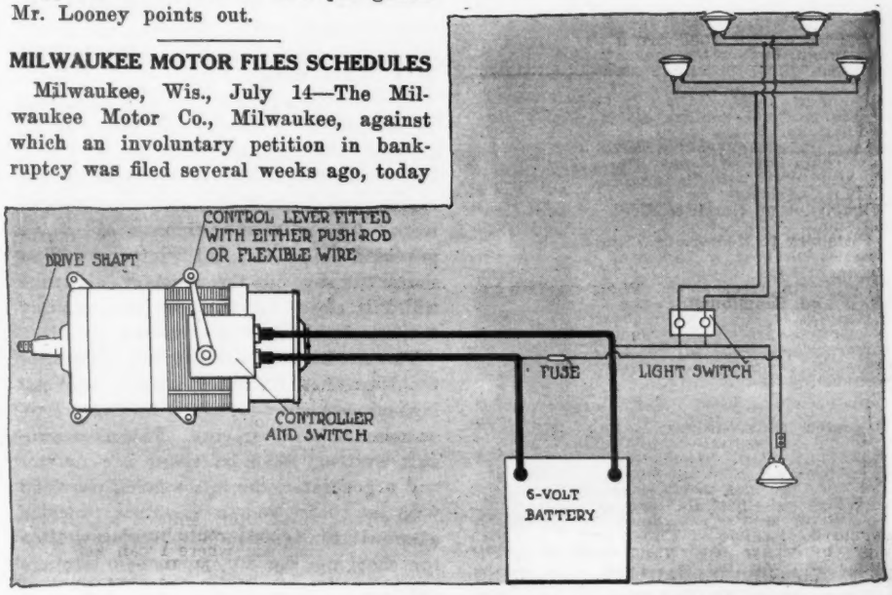
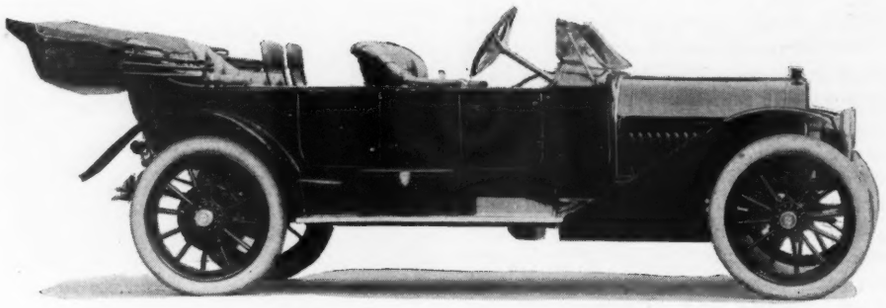


FIG. 2—SHOWING ABSENCE OF COMPLICATIONS IN JESCO WIRING

Herreshoff Line Embraces Six and Four-Cylinder Models

THE Herreshoff line of motor cars, for 1914 embraces two models, which, though essentially the same in design and construction as those offered for 1913, have several refinements and improvements, chief of which are the complete electrical equipment for cranking, lighting and ignition and the incorporation of four-speed gearsets in all models. The four-cylinder type and the small six-cylinder car brought out last year are the representatives, and to these two chassis are fitted almost any desired type of body.



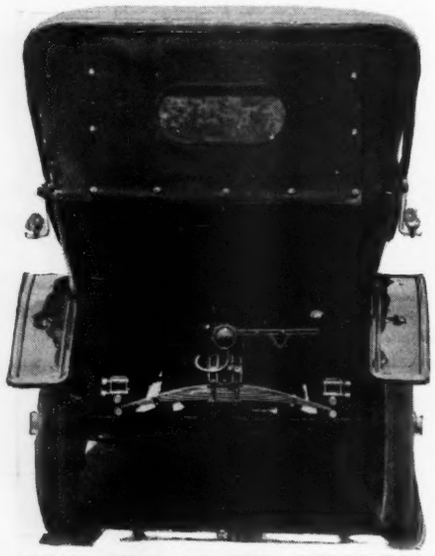
1914 HERRESHOFF SIX-CYLINDER TOURING CAR

Two Chassis Models Offered

Aside from the application of the electrical system the motors show no noticeable changes in design or arrangement of essentials. They are both 3⅜ inches bore and 4½ inches stroke, and are rated at 40 and 30 horsepower for the six and four respectively. Although the six is a T-head type, while the four-cylinder is an L-head design, the same general characteristics of construction are in evidence on each. Differences due to manifold arrangements occasioned by the different cylinder castings are of course necessary, but as to crankcase construction, methods of attaching the gearboxes for the unit power plant feature, and so on, show that the same designer made them both.

The cylinders are cast in block in both cases. To avoid confusion let us consider the larger power plant alone, and those points wherein the four differs from its larger brother will be pointed out.

This six power plant is really one of the smallest on the market. Its cylinder dimensions give it a stroke-bore ratio of 1.33 to 1, putting it in the long-stroke field. The exhaust valves are located on the right side while the intakes occupy the left. To economize space, the valve pockets are set diagonally.



REAR VIEW OF THE HERRESHOFF FOUR-CYLINDER ROADSTER SHOWING SPRING SUSPENSION AND AXLE CONSTRUCTION

Valves and springs are completely inclosed by easily-removable cover plates.

Both camshafts and crankshaft are mounted on three plain bearings each, making a rigid construction in this respect. These bearings are all of white metal.

Thermo-Syphon Cooled

Timing gears are placed forward and inclosed in the conventional way. Cooling is by thermo-syphon, and is augmented by large water outlet and inlet headers and a large fan at the front of the motor. The waterjacket space communicates around all six cylinders, due to the block casting. Inlet and exhaust manifolding are made as simple as possible. There are two main connections to the casting from the inlet pipe, while an equal number convey the burnt gases away.

The crankcase extends back to inclose the flywheel, and has a flange at its rear end to which a mating flange of the gear case bolts. The lower part of the crankcase is removable for inspection of bearings, cleaning out and the like.

The lubrication is of the splash type, having an independent well under each connecting rod. The oil is fed into these wells by a mechanical pump, which draws from a reservoir in the bottom of the crankcase. The wells overflow into this reservoir, and after filtering, the oil is forced to a sight feed on the dash and then back to the wells.

The Stromberg carbureter is continued on all models. The fuel is fed to it by gravity, the gasoline tank being placed under the front seat in the touring car models and back of the seat in the roadsters. There is an auxiliary air valve provided with two adjustments and a shut-off valve in the primary air tube which is closed for starting, thus sending a rich mixture to the cylinders.

The electrical equipment which features the Herreshoff line this year is a Westinghouse system adapted to the special requirements of these cars. This is a two-unit system; that is, there is a motor and a generator, the latter being provided with a timer and a distributor which adapts it for ignition purposes as well as for charging the 80 ampere-hour storage battery.

This battery in turn gives out its energy for driving the cranking motor and for lighting the lights. However, there is an automatic cut-out which causes the current generated to be sent directly to the lights above a given engine speed. The system is of the single-wire type, having a grounded return circuit. The operative voltage is 6, and the generator, which has no permanent magnets, is of the compound differential-wound type.

Details of Electric Generator

Due to this winding the output of this generator is controlled electrically. When the automatic switch connects the generator to the storage battery, the current rises in the latter rapidly with the speed until from 5 to 7 amperes are reached, provided the lamps are not burning. Above this amperage the rise is very slow, due to the greater resistance occasioned by the reverse compound field winding in the generator. This makes it impossible to charge the battery excessively in day running. Also on account of the windings, the output of the generator increases with the demand, so that when all lights are burning there is still sufficient stored energy.

The cranking motor is located on a base cast integral with the upper part of the flywheel housing, and its gearing to the flywheel is inclosed. There is a large reduction between the motor and flywheel. The generator is mounted on a bracket which is a part of the crankcase on the right side next to the timing gears.

To operate the cranking device it is necessary only to press down upon the starting pedal in the car. The switch has two points, the first movement of the pedal causing the electric motor to turn over very slowly to facilitate engagement of the gears connecting with the flywheel, and further depression of the pedal causing the motor to revolve much faster and spin the engine. Pressing down on this pedal engages the gears as well as making the electrical contact to the electric motor.

The location of the electrical units and their workings are identical with the four and six-cylinder power plants.

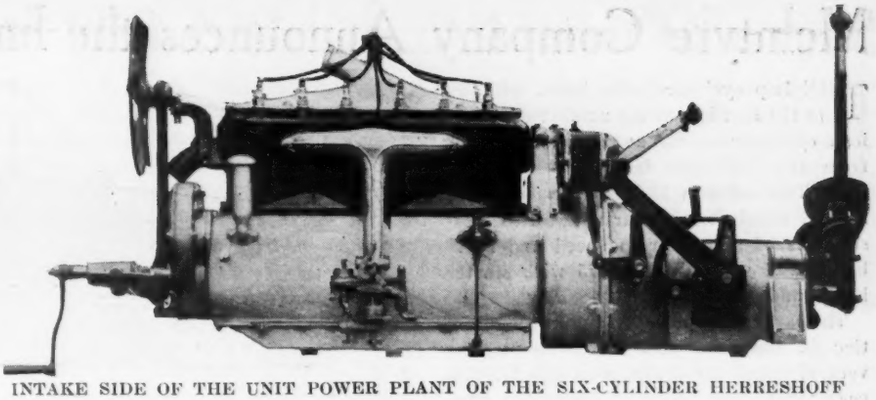
Like the pistons, conecting rods, valves, and so on, the clutch and gearset are identical for both four and six-cylinder models. The gears provide four forward

speeds and reverse and, together with the dry-plate clutch, are housed in an aluminum casing which bolts to the flywheel housing flange. On the six the clutch has twenty-four plates, while there are twenty in the four-cylinder models. The gear-shift is in the center, while the drive is on the left, making for the most convenient position for these members relative to one another.

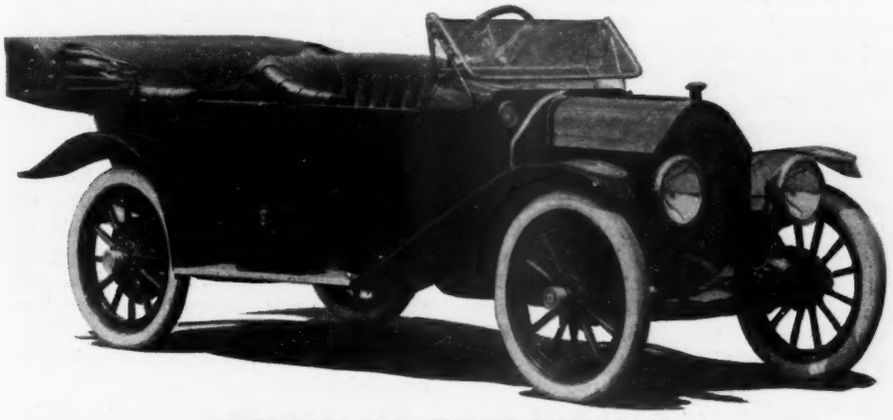
The propeller shaft is inclosed in a torque tube, which bolts to the semi-floating rear axle case through the conventional flange construction. Radius rods run from a point half way back on this tube to the ends of the rear axle. The axle shafts are of chrome nickel steel, while the usual complement of external contracting and internal expanding hub brakes acting on drums are to be found.

However, the rear spring suspension differs on the four and six. The latter has a platform suspension, there being a half-elliptic spring at either side and outside the frame, while a rear cross spring connects to the ends of these through shackles. This rear cross spring fastens to the end of the frame at the center. On the four the rear springs are half-elliptic, shackling to spring horns at their rear ends.

The wheelbase of the six is 124 inches, while the four-cylinder touring car has a 110-inch length between wheel centers, the roadster four being 10 inches less.



INTAKE SIDE OF THE UNIT POWER PLANT OF THE SIX-CYLINDER HERRESHOFF



HERRESHOFF FOUR-CYLINDER TOURING CAR

In addition to the equipment already mentioned the new Herreshoffs appear with demountable rims with one extra rim, electric lamps all around, electric horn, tire pump, windshield, speedometer, and other aparatus which is now almost regarded as a necessary part of the modern motor car.

The bodies are very attractive and appear in royal blue painting with the exception of the running gear, which is black. Nickel and black enamel are in evidence on all metal parts. In general, these bodies conform in every respect to the dictates of modern design. Roominess and comfort are notable.

TWO-SPEED AXLE FOR CADILLAC

The Cadillac Motor Car Co. has announced that the 1914 models will appear on the market with what is known as a two-speed rear axle, which is operated by an electric switch. Instead of employing one driving pinion and one driving bevel, the new Cadillac construction makes use of two pinions and two bevels incorporated in the same axle. This affords two different gear ratios, each driving direct from the engine to the axle without intermediate gearing. In selecting this type of drive the Cadillac company claims that it has done so because no single gear ratio can be just right for all speeds and conditions.

In the two-speed rear axle to be seen on 1914 Cadillac cars, the low direct drive is geared 3.66 to 1 and is to be used for city driving, where starts and stops are quite frequent. The operation of an electric switch brings the high direct drive into action. This is geared 2.5 to 1 and is of advantage, it is claimed by engineers who have given careful study to the proposition, when speeds of 16 miles per hour or more desired.

The advantage of the high direct drive is said to give a 42 per cent increase in car speed for any given engine speed. That is, if at 700 revolutions per minute of the motor the car is traveling 21 miles per hour on the low direct drive, if the high direct drive is put into play the car will travel about 30 miles per hour. Thus, for the same engine speed a greater car speed is obtained, which spells economy in fuel, because the engine is turning over slowly in comparison with the speed of the car.

Besides the fuel saving obtained from this method of driving, the frictional loss between the parts is decreased. This is evident for the operation of these parts is slower when the high direct drive is used. Another claim made for the two-speed rear axle is that it gives quieter running and eliminates vibration to a great extent, which will be appreciated by the motorist.

MITCHELL-LEWIS REPORT

New York, July 15—The Mitchell-Lewis Motor Co.'s financial condition as of May 31, 1913, as reported in commercial circles, is given below:

ASSETS

Tangible assets	$3,175,630
Cash	201,826
Accounts receivable	1,123,579
Notes receivable	388,292
Inventory	3,536,356
Prepaid expense	66,705
Total tangible assets	$8,492,388

LIABILITIES

Six per cent gold notes	$1,750,000
Notes payable	1,038,500
Accounts payable	519,300
Reserves	143,150
Accrued expenses	81,239
Other reserves	134,192
Total liabilities, excluding capital stock	$3,666,381

The company sold $2,500,000 notes to bankers November 1, 1911, of which $1,000,000 will have been paid off August 1, next. The remaining $1,500,000 has been extended. The Mitchell-Lewis company's earnings in recent years have ranged from $550,000 to $800,000 annually, it is asserted by authorities who are in a position to know.



REAR VIEW OF HERRESHOFF SIX-CYLINDER TOURING CAR SHOWING PLATFORM SPRING SUSPENSION

McIntyre Company Announces the Imp in Cyclecar Field

THE Imp cyclecar is the latest addition to the fast increasing number of American cyclecars so far anounced, and hails from the McIntyre factory, of Auburn, Ind. This car is a 10-12 h.p. tandem-seating, friction-belt drive car with all the possibilities of a big car in speed and reliability, and yet sells for $375 with starter lamps and horn.

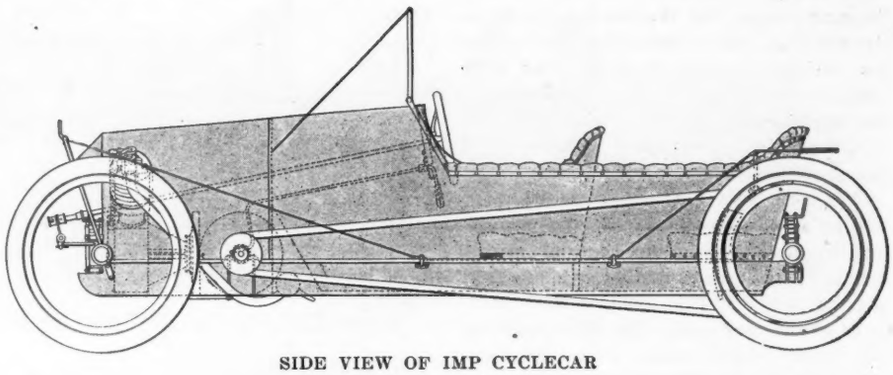
The car, while following motorcycle practice in the final belt drive, adopts the very simplest car features in the friction gear for change speeds. While this type of drive has made good in big cars it has a double advantage in the cyclecar where the motor speed is higher and the disks small as a result, and where the belt drive to the rear takes out any danger of overloading the friction wheel. The belts to the rear are of the V type of extra size and strength, and exceptionally long, so that long life is secured in the belt, less tension is needed, and 10,000 miles should be done on one set of belts. The principle feature of the drive, in fact, is the long belt idea.

The motor is of the V type commonly seen in motorcycles, but fitted with a heavy outside flywheel and friction disk combined, and a special carbureter for slow running.

The most important features needed to allow speed on cyclecars are low weight and correct springing. The Imp cyclecar has the weight very low down, the ground clearance being 8 inches, but the frame being underslung and all of the driving mechanism at either side of the body instead of underneath, the riders sit comfortably in the position taken in racing cars seated but 16 inches from the ground itself. The car can be tipped at a 45-degree angle with passengers in without upsetting. No big car is less likely to tip than the low type of cyclecar as often has been proved abroad.

The springing system in the new car is unique. The car has no axles but has instead two flat springs set crosswise of the frame, and fastened at the ends to yokes, between which the wheel spindle is fitted, in front to a pivoted steering knuckle, in back to a rigid arm. Thus the weight of the car is directly on the springs and the only unsprung weight is the wheel weight. The springs are very resilient and easy, as allowed by the tandem seating, with all the weight in one line whether one or two ride—not the case with the side-by-side arrangement.

Steering is accomplished by a steering wheel in the center of the car, the post running to the front and ending in a bobbin, around which run steel cables to the steering arms of the front knuckles, a spring keeping them taut as shown. A tie rod across the front connects the arms, This steering is very easy and almost irreversible, as much so as the most expensive constructions on the market today.



SIDE VIEW OF IMP CYCLECAR

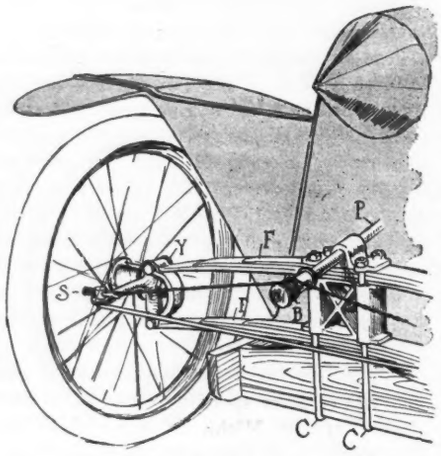
The controls work from the wheel as is usual, the gearshift lever being in the center of the car just under the wheel, and pivoted in the cowl dash.

The body design is especially pleasing. In front of the driver stretches a 5-foot hood covering the power plant. On either side the car edges are upholstered and at the back the body comes to a vertical wedge point giving a fine stream line effect and decreasing wind resistance. There is space at the back for tools and spares and a small luggage space.

The car, it is claimed, will make 45 miles an hour, and run 50 miles on a gallon of gasoline. With the variable speeds and reverse offered there should be no difficulty in climbing any hill the wheels will stick to, while on account of the simplicity of the parts there should be a very low repair cost. The machine has ball bearings throughout—only annular bearings being used, and contains but two gears—the timing gears—and these inclosed of course, so that the car should be exceptionally quiet. The motor is well muffled and no cutout is fitted.

OHIO FALLS PLANT SOLD

Louisville, Ky., July 14—Following a receivership suit of Ferdinand Kahler, president of the Ohio Falls Motor Co., in New Albany, Ind., against the company to recover $2,800 on a note for supplies furnished, the plant of the concern was disposed of at receiver's sale on July 7 by John Bruns, receiver. O. E. South, treasurer of the company, bid in the property at $40,545.69. The purchaser paid $15,000 in cash and assumes liens amounting to $25,545.67, including a mortgage of $22,825, together with street and sewer assessments and taxes. Mr. South represents in the purchase a new company which is in the process of organization to take over the plant and operate it on a more extensive scale than ever.



FRONT VIEW OF IMP

Property that changed hands at the receiver's sale consisted of the plant of the Ohio Falls Motor Co., in Vincennes street, including 6 acres of ground and a half dozen buildings; the machinery, equipment and stock.

It is the intention of the new company to devote the plant to the manufacture of an inexpensive runabout. It is expected that the operation of the plant will be resumed within a short time. The name of the new concern has not yet been selected. A meeting of the stockholders will be held in a few days to complete the reorganization.

Two years ago the American Automobile Mfg. Co., which planned to place the Jonz car on the market, was organized at New Albany and the concern purchased the plant of the old New Albany Woolen Mills Co. that had been idle for a number of years, to convert it into a car manufacturing plant. The capital stock of the company was placed at $900,000 and quite a large amount of stock was sold. The enterprise was advertised extensively in magazines and it is said purchasers of stock came from every state. Later the company was reorganized under the name of the American Automobile Corp. and a year ago a third reorganization was effected.

DETROIT TRADESMAN KILLED

Detroit, Mich., July 15—Howard C. Chandler, general materials supervisor of the General Motors Co. of Detroit, was killed yesterday when his car upset on a country road near Pontiac, Mich. Mrs. Chandler was badly injured.

Series V-3 National Has Number of Detail Changes

IN addition to the announcements of a number of other prominent makers of their 1914 models comes one from the National Motor Vehicle Co., Indianapolis, to the effect that the new models, known as the series V-3, will see a number of detail changes over the National company's older series V-2.

Perhaps the most important changes made have been centered about the motor. The cylinders, of which there are four with a bore of 4⅞ by 6 inches, have greater waterjacket space around the valves and on top of the castings. Another motor change comes in the form of a constant level oiling system by which it is possible to supply oil to the motor whether the car is ascending or descending a grade. The motor camshafts have been increased in diameter from 1 1/16 to 1¼ inches and at the same time made longer and heavier. The diameter of the flywheel has been decreased 2 inches. The carbureter admission pipe has been raised 3 inches and a new type of eccentric air pressure pump has been installed.

Besides the above motor changes a great number of chassis improvements are to be noted. The radiator of the new National will be of the vertical tube type instead of the square tube as heretofore. The front axle has been raised ½ inch to give greater clearance and the tire irons have been changed so as to throw the tire farther back. To permit of shorter turning radius the ball rod has been bent slightly and the outer axle spindle made ⅛ inch larger.

Another innovation in body design is to be noted on the new Nationals. On the touring cars there is provided a space under the front seat for the insertion of a suit case. The changes mentioned are by no means all that have been made as in many parts different metals have been substituted which have been found to be more efficient than those used last year by the National company.

In all, the general appearance of the car remains unaltered and such installations as the Bosch dual-double ignition, Rayfield carbureter and Gray & Davis starting system are to be seen on the new series V-3.

Aside from the above changes the National chassis of 120 and 128-inch wheelbase, respectively, will contain the same features noted on the 1913 models. The cone clutch and selective gearset located amidships, left drive and center control and the floating rear axle will again be seen on National cars.

The four-cylinder motor will have T-head cylinders cast in pairs and the splash-pressure oiling system and pressure fuel feed still retained.

Recent Exports Show Slight Increase Over Those of Year Ago

WASHINGTON, D. C., July 12—Detailed figures on motor car exports for the month of May and for the 11 months period ending May, together with figures for comparative periods, were announced today by the federal bureau of statistics. As previously reported in Motor Age, the car exports in May, last, numbered 3,036 machines, valued at $3,155,189, as against 3,009 cars, valued at $2,963,818, exported in May a year ago. During the 11 months period the exports increased from 19,816 cars, valued at $19,433,965, in 1912, to 23,132 cars, valued at $23,821,782, in the year 1913.

Canada continues to be the largest purchaser of American made cars, 862 machines, valued at $1,255,771, having been shipped to that country in May. However, this is a distinct drop from Canada's purchases in May a year ago, when 1,109 cars, valued at $1,352,856, were shipped there from the United States. During the 11 months' period, however, the exports increased from 5,533 cars, valued at $6,534,088, in 1912, to 6,829 cars, valued at $8,636,880, in 1913.

The detailed shipments to other countries for the periods under consideration were as follows:

Country	May, 1912 No.	May, 1912 Value	May, 1913 No.	May, 1913 Value
France	63	$ 48,980	108	$ 72,149
Germany	49	36,719	192	145,799
Italy	30	35,605	5	12,500
United Kingdom	673	465,722	473	354,686
Other Europe	204	155,125	294	236,447
Canada	1,109	1,352,856	862	1,255,771
Mexico	8	15,370	6	5,110
West Indies and Bermuda	29	36,237	45	47,591
South America	162	183,292	213	248,707
British Oceania	445	412,565	234	220,372
Asia and other Oceania	152	149,309	282	272,174
Other countries	85	283,883	322	283,883

Country	11 months ending May, 1912 No.	11 months ending May, 1912 Value	11 months ending May, 1913 No.	11 months ending May, 1913 Value
France	507	$ 419,816	753	$ 571,049
Germany	261	190,440	692	632,247
Italy	169	157,852	276	247,863
United Kingdom	5,389	4,231,487	3,593	2,737,438
Other Europe	1,062	870,311	1,601	1,368,654
Canada	5,533	6,534,088	6,829	8,636,880
Mexico	266	410,129	265	496,981
West Indies and Bermuda	299	318,618	415	430,106
South America	1,444	1,736,921	2,651	2,978,020
British Oceania	3,479	3,137,612	2,744	2,582,239
Asia and other Oceania	1,001	1,038,677	2,025	1,944,287
Other countries	406	388,014	1,288	1,196,018

Imports of cars continue to show big decreases. The number imported in May, 1912, was seventy-six, valued at $165,759, decreasing to forty-two in May, last, the value of which was $113,737. The imports for the 11 months period decreased from 921, valued at $2,033,254, in 1912, to 704, valued at $1,653,864, in 1913. The imports by countries were as follows:

France, May, 1912, 41, valued at $95,965; May, 1913, 17, valued at $49,515; 11 months, 1912, 380, valued at $914,529; 1913, 337, valued at $799,099.

Germany, May, 1912, 5, valued at $10,114; May, 1913, 8, valued at $21,154; 11 months, 1912, 113, valued at $250,507; 1913, 90, valued at $235,526.

Italy, May, 1912, 11, value, $17,424; May, 1913, 9, value, $23,615; 11 months, 1912, 126, value, $189,130; 1913, 112, value, $198,782.

United Kingdom, May, 1912, 11, value, $28,324; May, 1913, 3, value, $6,300; 11 months, 1912, 181, value, $417,506; 1913, 77, value, $216,632.

Other countries, May, 1912, 8, value, $13,932; May, 1913, 5, value, $13,153; 11 months, 1912, 121, value, $261,582; 1913, 88, value, $203,825.

AMERICAN CARS IN ITALY

Detroit, Mich., July 12—Mario Andreotti, representing the firm of Andreotti & Co. of Rome, Italy, left today on his return home, after spending 2 weeks at the factory of the Michigan Motor Car Co., Kalamazoo. Representing his company, he took back with him a contract for the distribution of Michigan cars for all Italy. He was accompanied by Sisto Ripamonti of Rome, who contemplates establishing a Michigan agency on a large scale either at Florence or Naples.

"American cars, especially of medium price, have a distinct lead in Italy over the cars of any other country," said Mr. Andreotti. "There is, of course, competition from England and France, but so far these countries have not been able to produce a car of the American grade at the popular price.

"The demand for the American medium-priced car is due primarily to the fact that Italy produces no medium-priced cars. It is, of course, recognized that Italy leads the world in the production of fine cars. Turin is the center of the highest development of the motor car, so conceded by builders everywhere. But in Italy, the cars that develop 35 horsepower or better have a price range of 20,000 to 35,000 lire, or about $4,000 to $7,000.

"We have, however, a large and growing class of purchasers who want a 40-horsepower car, and are willing to pay around $2,000 for it. This demand the Italian manufacturers do not yet supply."

It must not be supposed, however, that the demand for medium-priced cars in Italy is confined exclusively to the middle class. During the last year Andreotti & Co. numbered among their customers for Michigan cars Prince Prospero Colonna, ex-mayor of Rome; Chevalier Rocchi and the Prince d'Antuni del Drago.

Mr. Andreotti is much interested in the Underwood tariff bill, especially the provision for the reduction of the tariff on cars. He could not see, however, how the great majority of American manufacturers would be affected since the exports from Italy are of high-priced cars.



The Realm of The Commercial Car



Co-Operative Delivery as Practiced in the Small Town

By William B. Stout

WHILE co-operative delivery in small towns often prohibits the use of motored vehicles for house work by adding stops per mile, the motor truck as an adjunct to the system in getting material to the stores has a wide field. Towns suburban to Chicago or other large cities can use the motor truck to bring produce to the town in the early morning from city markets, getting it fresher, cheaper and bought to closer figures than is possible with goods hauled by train.

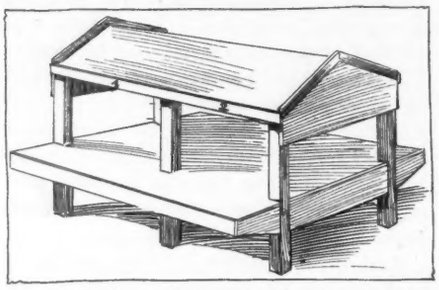
Highland Park, 25 miles north of Chicago's center, has a co-operative delivery system in operation which is served from the markets in this way. Though not related directly to motors, the co-operative horse delivery system in connection has much of interest for those interested in the house-to-house end of delivery.

The first stage of the work, of course, is getting the green stuff and produce from the Chicago market, 25 miles away, in time for morning trade. For this work two motor trucks are employed, one of 2-ton capacity and one of 1½-ton size. These machines are owned by the Loer Bros. Transportation Co., of Highland Park, a progressive garage firm, and are operated under contract with the grocers' association, described later.

Run on Train Schedule

The machines are cared for by the garage firm, leaving each morning at 4 a. m. for Chicago. The run to Chicago takes from 1½ to 2½ hours, depending on weather, roads and temperature, but is made on regular schedule so far as possible. Arriving at the market, a buyer for the grocers' association buys for the entire town and the truck is loaded. The truck is back at Highland Park again with load at 10 o'clock on schedule, this having been kept for 2 years except on two mornings when tire trouble held up the machine for a short time.

Thus a 50-mile run has been made by the machine before the day is well begun,



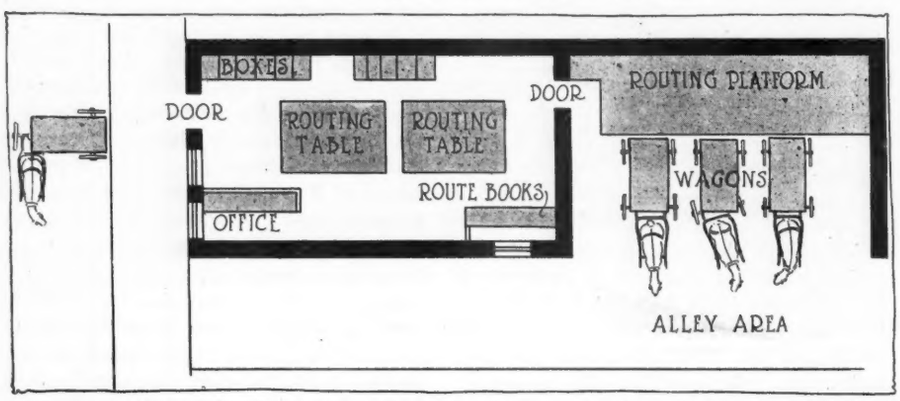
The routing tables used in the Highland Park station. Bundles on the top shelf roll to the edge handy for sorting

and the Loers have the machine for their own use for the rest of the day. The run to the city more than pays for the truck, so that the rest of the day is velvet. The big machine is used in heavy hauling and moving and has done as high as 130 miles in 1 day's work. The smaller machine is used in contract work and for reserve and extra loads and trips.

It would be impossible for horses to bring this produce from the Chicago market, while if brought by railway the frequent handling would spoil the fresh stuff to a much greater extent. This system allows of individual buying, quick shipment and few rehandlings.

The following is descriptive of the house delivery system:

Highland Park is now delivering house-to-house packages such as groceries, meats, hardware, etc., at 5 cents per package; while in Wilmette, a similar suburb 10 miles nearer the city, the cost-per-package rate is 11 cents. The territory is similar, and conditions are almost identical; the population is just about as thick in one community as in the other, and the trade is about of the same class. The roads in one place are as good as in the other—in fact, all streets are excellently paved in both communities. Wherein lies the cost difference in deliveries?



Plan of Highland Park routing station, showing loading platform, office and routing tables

Highland Park is served by a co-operative merchants' delivery system, so that all bundles are handled by one company controlled by all of the stores in the service, and yet at the service of firms outside the corporation at a price. Wilmette holds to the old each-firm-deliver-its-own-goods plan and pays the difference, amounting to 6 cents for each package delivered. The six grocery stores of Wilmette deliver on the average in the neighborhood of 1,000 packages per day, this making a loss of $560 per month paid by the citizens of Wilmette to their grocers for services not received. This might as well be saved by the adoption of the Highland Park system.

An attempt was made to introduce the co-operative system in Wilmette a few months ago, the start being made by J. J. Nilles, running a grocery and meat store, who brought the plan before the association, but through local conditions which are not a part of this story the idea was not carried through.

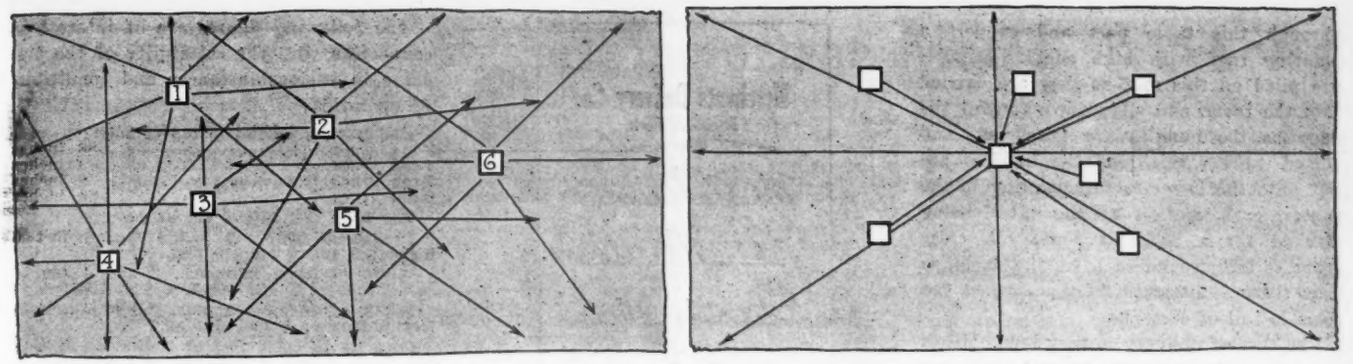
Conception of Idea

"The first real idea of the waste which we had in delivering came to me when I was sitting on the porch at home one afternoon," said Mr. Nilles. "Within 15 minutes while sitting there the wagons from every store in the city went by the door. Two wagons could have hauled all that went by, and in all six equipments were being used to do the work possible to half the number. The idea struck me so forcibly that I brought the matter before the other merchants, but we couldn't put it through.

"The scheme was to form a separate delivery company and have this company buy in all the equipment that all the grocery and meat stores now own. Shares would be distributed in proportion to what equipment was put in. All six of the stores were to go in, and the twenty-five horses and wagons at present could easily be replaced by only ten units and give four deliveries a day instead of the three we now give.

"It takes three horses and wagons to handle my work here and give proper deliveries. These go out at whatever times they can. Some days I probably make sixty trips because Mrs. X here or Mrs. Y there will call up for a nickel's worth of onions she must have right away for a stew, and if I want to keep up service I must send out a hurry delivery. It is part of the system and we all have to do it. It means a man at the telephone tending to petty things and deliveries that cost 15 cents to take packages on which the profit is probably 2 cents."

As this talk was going on the phone



Showing the difference ofoperation in ordinary and co-operative delivery systems. The left shows the number of trips in Winnetka to cover the territory delivering over the same relative area and the same number of packages. The righthand shows the saving by co-operative work

rang and a woman living 1 mile away called up to see if she could get an immediate delivery of a small order. There was no wagon in and the delivery could not be made. The incident clinched the statement just made.

"Fully one-half of the delivery expense in Wilmette could be saved by co-operative delivery," said Mr. Nilles, "and we may have it yet."

The three horses are costing the above mentioned store $25 a month for feed. Actual figures place the delivery cost of this firm—and this is on the same system as other stores of the community—at 11 cents per delivery. The territory covered is 2 miles wide by about 3 miles long, all streets being level and well paved. Wagons cover about 12 miles per day and make 150 to 175 stops. On Saturday, June 28, the three wagons delivered from 7:30 a. m. to 7 p. m. 387 packages, making 18 miles. On the third morning trip alone thirty-seven stops were made by one wagon and it was back at lunch time. The wagons make on the average about eighteen stops per mile. Only one-horse outfits are used.

Such is the condition in the community served with the ordinary delivery system.

Highland Park System

Highland Park, located, as before stated, about 25 miles north of Chicago, is 10 miles beyond Wilmette. The territory served by the stores is 1½ miles wide and 4 miles long, taking in Highland Park itself, Ravinia, Highwood and Fort Sheridan, neighboring communities. The merchants here have combined, have pooled equipment and have started the kind of delivery which Wilmette tried to get. This system has been in operation nearly 2 years. The grocery stores of the city and meat markets are its biggest supporters, followed by hardware stores, laundries, dry goods stores, etc. Many stores not in the organization have their delivery handled by the system at a contract cost of 10 cents per package. Private parties may call up also and have single packages delivered, such as suits to the tailor or dresses to the dry cleaner.

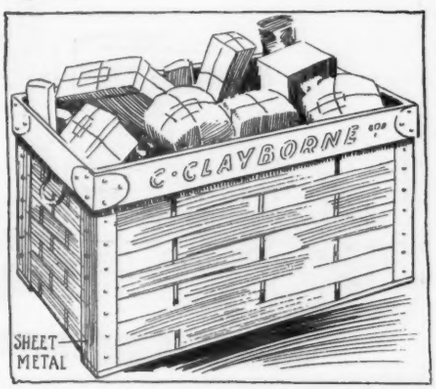
Eight wagons are in the service and these collect the goods from the stores in the service four times a day on exact schedule. They then run to the central distributing warehouse or station and are spread out and routed as described later. Inside of 15 minutes from arrival the wagons are away again and the deliveries begin.

As high as eighty deliveries per mile are made, and the horses are trained so that when they hear the driver coming they start on to the next house. The average of stops is forty per mile. Only one boy goes to a wagon, no helper being used. One boy will deliver as many as 172 packages a day, while a store across the street from the routing station, not in the combine, makes a maximum of 100 a day per man.

1,000 Packages in 1 Day

On Saturday, June 28, the eight wagons delivered an even 1,000 packages. As a coincidence it was mentioned that a year previous to that date exactly 999 packages were delivered.

The wagons make four trips a day, leaving on schedule at 8:15, 10:15, 2:15 and 4:15, from the routing station, having left the stores on the even hour. Delays at the stores hold some of the machines so that one may get in a few minutes ahead of the others. This first wagon backs up at the platform at the rear of the station and starts to unload, the bundles being stacked in piles on the platform according to route. Another wagon arrives about the time the first is empty, and the first driver helps the second to unload and sort. By the time all eight wagons are in, the loads are almost sorted, as all men work together.



Type of loading crate used in the Highland Park delivery. These are all of uniform sizes and can be stacked four or five high

Packages are listed on slips, and for each C. O. D. an envelope is furnished, as in the accompanying illustrations. This envelope has spaces for the name and address and the amount. The number printed large at the bottom indicates the nature of the package, whether meat, groceries or hardware, whether for a firm in the association or not. From these numbers charges are listed to the firms for whom the delivery is being handled.

All C. O. D.'s are listed before the load goes out, in a special book for the purpose, the amounts being charged up against the drivers. If the parties are not at home or have no change, the driver can at his own discretion mark O. K. on the envelope and return it to the store for later collection.

On each package a small ticket printed on stiff manila 2 by 4 inches in size is displayed in plain sight, this being slipped under the cord of the package. These slips are shown in the reproductions, and the big numbers again indicate the nature of the package, etc.

Construction of Carrying Boxes

The packages are all put into boxes, these boxes being of uniform sizes and of special construction as shown. They are made of tough wood with metal corners and laced with sheet metal for extra strength. They have dowels in the bottom so that they may be set on top of each other and will stay that way. As many as 100 of these boxes are stacked on a wagon and the load is arranged so that as empties come back the full boxes come to the front. Handle openings are cut into each end. The wagon bodies are made to fit the box sizes. One of these boxes is shown herewith.

A better proposition might be the folding box used so commonly about many cities, this doing away with the problem of disposing of empties.

In rainy weather and for perishable goods and meats a sorting table idea is used in the substation room. This is shown also. There are two of these in the room.

The main table is heavy and supported on four 3 by 3 posts, the table being at standard height from the floor and about 5 by 9 feet in size. The posts run up

through this table part and support a slanting roof with high edges. Bundles are piled on this roof as they are carried into the room, and slide down toward the edge as the bundles are taken out and sorted. From this roof the bundles are put onto the lower table according to the routes, each section of the table being marked for a different route. A clear space is left around each sorting table, so that there is little interference when the room is full of sorters.

The cost of delivery is very low. Meats are delivered at a cost of but 4 cents per package, groceries at about 5 cents. C.O.D. orders do not seem to cost more than ordinary deliveries.

Advantages of System

"The big advantage to us," said Johnson & Sons, one of the largest grocers, "is not so much in the lessened cost of delivery, but that our day is not continually cluttered up with petty orders. With the old system it was, 'Send this out quick to Mrs. S.' Customers would call up and want an order at once. Now they all know that deliveries leave at certain hours. If the order is in by a certain time they can have the goods for lunch; if not, they cannot get it until next delivery. They get used to it and the system saves them worry and time, for they get a regular habit of leaving the orders at the proper time."

His conversation was interrupted by a chauffeur who came in for two green peppers for Mrs. Blank.

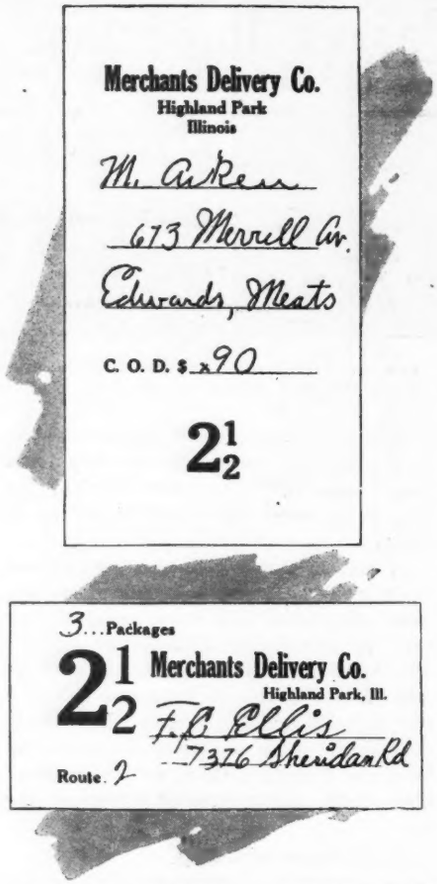
"With the old arrangement I would have had to send those two green peppers out on a mile run at a cost of from 10 to 20 cents," said Mr. Johnson. "Now she knows she made a mistake in not calling up, and sends her chauffeur. Our day is thus left for greater care in filling orders and tending to the customers' wants with less worry, rush and mistakes."

NEW DUMP BODY

The Packard and Kelly companies have a new type of hydraulic dump body which is operated from the drive shaft of the car and controlled by a small lever in the cab. The body may be raised, lowered or held at any desired angle while the truck is in motion or when it is at rest.

The mechanism operates on the hydraulic principle. The pressure on the oil in the lifting cylinder is obtained from a gear pump located under the driver's seat. This forces the oil under the piston when the operating lever is worked and drives it up, thus dumping the load. When the piston is at the top a port is opened in the side of the cylinder, which automatically stops the pressure, as the oil merely comes in and out again. The simplicity of the system is its greatest point.

The device is the invention of G. A. Wood, of St. Paul, under whose patents the hoist is built. It is claimed the body will dump whether the car stands level or at an angle. An added advantage is the low height of the mechanism, allowing it to go into a door or under a viaduct without interference, a big advantage when the truck is used with hopper loading, as is so often the case when a dump body is used. The body itself is made of heavy boiler plate and mounted on a channel subframe. An automatic tail gate allows of a maximum opening when the body is fully elevated. The maximum elevation of the body is 45 degrees, this being attained in twenty seconds. It takes 15 seconds to lower the body.



Slips used to check up deliveries in the Highland Park co-operative system. The big number shows the class of package and the charge

The following figures are of interest in connection with the suitability of the machine in various instances and conditions of operation:

Height from ground to top of hoist:

3-ton truck	88 inches
4-ton truck	89 inches
5-ton truck	88 inches
6-ton truck	89 inches

The body dimensions are as follows:

Length of body: 3 and 4 ton, 8 feet 6 inches; 5 and 6 ton, 10 feet.

Width of body, minimum, 3 and 4 ton, 4 feet 3 inches; 5 and 6 ton, 4 feet 3 inches.

Width of body, maximum, 3 and 4 ton, 6 feet 6 inches; 5 and 6 ton, 7 feet.

Capacity in cubic feet of bodies for 3, 4, 5 and 6-ton chassis determined by commodity to be handled.

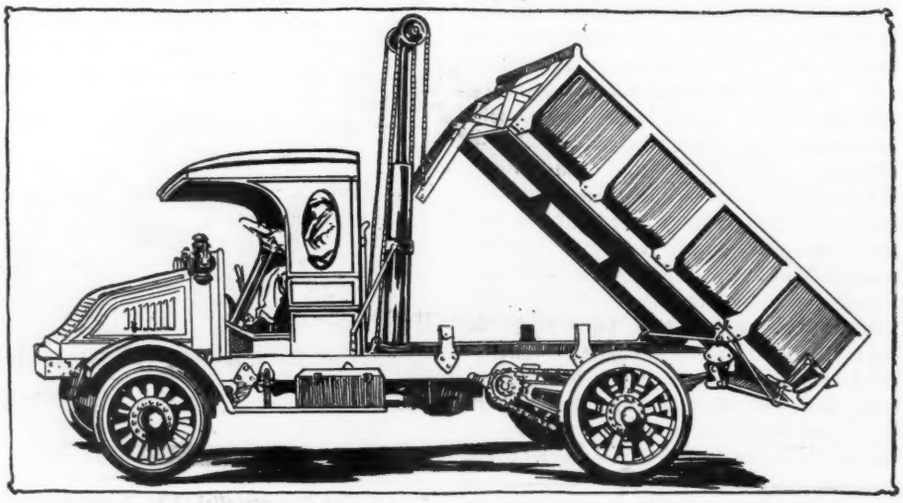
	——CUBIC-FEET——			
	3-Ton.	4-Ton.	5-Ton.	6-Ton.
Ashes	69	92	115	138
Common brick	54	72	90	108
Hard coal	111	148	185	222
Soft coal	129	172	215	258
Concrete	48	64	80	96
Dry earth	81	108	135	162
Gravel	60	80	100	120
Sand	60	80	100	120

RECEIVER FOR TRUCK COMPANY

Lack of capital and alleged mismanagement have forced the Grand Rapids Motor Truck Co., of Grand Rapids, Mich., into the bankruptcy court.

The company, which manufactured exclusively 1½ ton trucks, was induced about 2 years ago to move from Decatur, Ind., to Grand Rapids. It was reorganized last February, capitalized at $500,000 with many local stockholders. A few months ago announcement was made of a merger with the Michigan Hearse and Carriage Co., but the deal never came to a head, due, it is said, to inability of the truck company to meet the conditions of the compact.

Branch agencies established in several of the larger cities, including Boston, New York, Philadelphia, Chicago and Minneapolis, are said to have entailed a heavy drain on the resources of the company without an adequate return in business. Reorganiaztion may be attempted, as the truck is regarded as a standard product, but just now the company's affairs are in the hands of the Grand Rapids Trust Co., appointed receiver by Referee in Bankruptcy Kirk E. Wicks.



New Kelly dump truck using the hydraulic mechanism operated by gear pump. Both this and the one on the opposite page are made by the Wood Hydraulic Hoist Co., of St. Paul, Minn. The body and transmitting and operating devices however, are the products of the respective companies

State of Maine Passes Important Motor Truck Bill

THE motor truck bill passed at the recent session of the Maine legislature is important to motor manufacturers and dealers in trucks, for when one looks at it closely it is seen that the restrictions are somewhat severe if literally applied. For instance, as a 5-ton truck is a heavy vehicle, weighing sometimes that much itself, all such trucks must get a permit before being allowed to operate on the Maine highways if they are to carry their full load, for 9 tons is the limit without a permit.

In the matter of speed the trucks of about 2 tons, carrying a full load are limited to 15 miles an hour, while 6 tons, or what might be carried on a 3-ton truck, cannot go above 6 miles an hour. As the big fight this year was made on the bond issue, attention to the truck bill was not very acute, primarily because the use of trucks in the state is not general. But with the gradual waking up to their value more will be used, and then there will be snags such as this law. It was part of a campaign inaugurated with Massachusetts, which was to lead the way for New England, but the Bay state plans were rudely upset by the motor interests, and the same thing happened in Rhode Island. Meanwhile Maine went along and put its bill into law. Here it is:

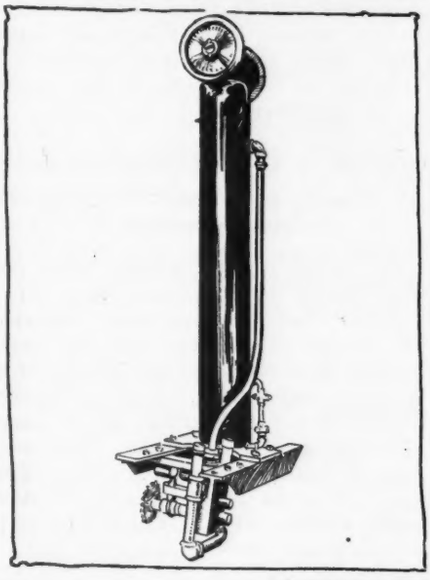
Section 1—No traction engine, trailer, motor or other vehicle shall be operated upon or over a highway or bridge in this state, nor shall any object be moved over or upon a highway or bridge, upon rollers, wheels or otherwise, in excess of a total weight of 9 tons, including vehicle, object or contrivance and load, without first obtaining a permit mentioned under section 3 of this act, from the authority or authorities in charge of the maintenance or care of said highway or bridge; nor shall any vehicle be operated or contrivance moved upon or over said highways or bridges which has any flange, rib, clamp or other object attached to its wheels or made a part thereof, which will injure, cut into or destroy the surface of the highway or bridge, nor shall any such engine, contrivance or object for moving heavy loads be operated upon any highway or bridge the weight of which exceeds 800 pounds upon any inch in width of the tire, roller, wheel or other object without first obtaining said permit.

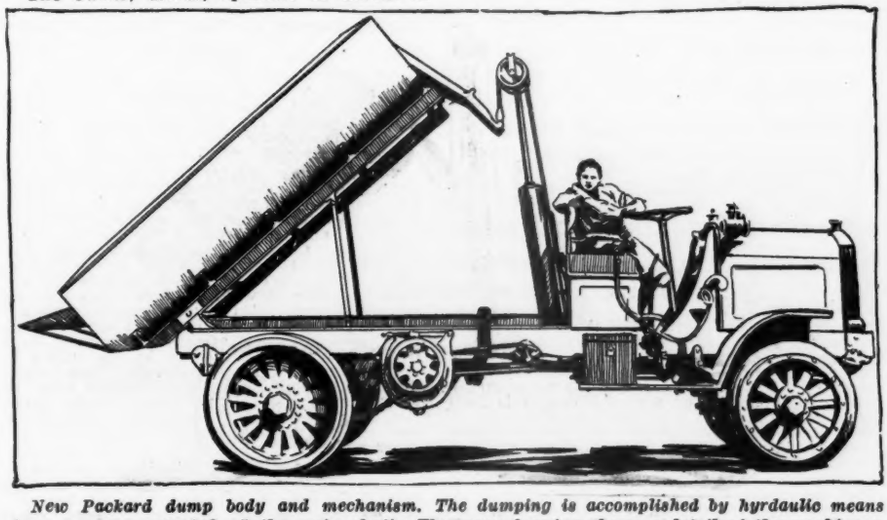
The owner, driver, operator or mover of any such engine, vehicle, object or contrivance over said highway or bridge, shall, unless relieved from liability in said permit, be responsible for all damage which said highway or bridge may sustain as a result of said action on his part, and the amount thereof may be recovered in an action on the case by the city, town or plantation, or in behalf of any unorganized township, by the county where the injury is done.

Section 2—No steam traction engine, with or without trailers, and no motor truck carrying a weight in excess of 4 tons, including the vehicle, shall be operated upon any highway or bridge at a rate of speed greater than 15 miles an hour; and no such vehicle carrying a weight in excess of 6 tons, including the vehicle, shall be operated upon any highway or bridge at a rate of speed greater than 6 miles an hour when such vehicle is equipped with tires of hard rubber or other similar substance.

Section 3—The Maine highway board, county commissioners, superintendents of streets, selectmen or road authorities having charge of the repair and maintenance of any highway or bridge in any of the cities or towns of the state are hereby authorized upon proper application in writing to grant permits for the proper moving of heavy vehicles, loads, objects or structures over said highways and bridges, which permits when duly granted, shall authorize such movement. Said permits may be general or may be limited as to the time and the particular roads and bridges which may be used, and may contain any special conditions and provisions which in the opinion of the authorities granting the same are necessary for the protection of said highways or bridges from injury. The authorities having charge of any such bridge are hereby authorized to make regulations limiting the rate of speed of any of the vehicles mentioned in this act passing over said bridge to a rate of speed not to exceed 6 miles an hour, provided notice is posted conspicuously at each end of such bridge affected by such regulation.

Section 4—Any person violating the provisions of this act, or the regulations made or permits granted under authority thereof, shall be liable to a fine of not less than $10 nor more than $500 for each and every offense, and said fines shall be paid into the treasury of the city or town when any highway or bridge is injured which is under the care of said city or town and into the treasury of the county, in behalf of any unorganized township to be used in the repair of highways and bridges within their respective jurisdiction.





New Packard dump body and mechanism. The dumping is accomplished by hyrdaulic means from a pump operated off the main shaft. The upper drawing shows a detail of the machinery, the gear pump and sprocket showing at the bottom. The lower drawing shows the body in use. The low build of the dumping apparatus is a great advantage

NEW HAMPSHIRE'S TRUCK LAW

A change has been made in the registration of the motor trucks in New Hampshire this year so that now instead of paying the usual $10 fee for all kinds of trucks the price varies according to tonnage. As the motor organizations in New Hampshire are not organized to fight such legislation it slipped through without much protest; and then again there are not many trucks used in the state. The new fee provides rates as follows: One ton, $10; 1 to 2 tons, $12.50; 2 to 5 tons; $15; more than 5 tons, $20. All vehicles carrying passengers for hire are now rated at $10 and do not come under the classification of the commercial vehicle scale. The legislature was reasonable in its change for dealers so that now instead of paying a fee of $40 for the registration of its cars the amount has been dropped to $25. However, if a dealer uses any of his cars for hire such cars must be registered at $10. This is done to protect the livery men, many of whom have sold their horses and now use motor vehicles, and it was presumed that it would not be fair to have motor dealers competing with them free. The registration of cars under the 15-mile zone is $2. All these sections except the one relative to the fees for registration of trucks went into effect some weeks ago. The new truck fees go into effect January 1 next.

NEW YORK BUYS MOTOR PATROLS

The R. & L. Co., of New York, eastern distributor for the Garford company, has delivered to the New York police department ten Garford trucks for use as patrol wagons at the various police stations of the metropolis. The order was placed several months ago by the police commissioner, Rhinelander Waldo, when a report of the department set forth the fact that three Garfords used during 1912 had saved $19,000, or more than three times their original cost in a single year.

Within the past few weeks the Garford also has delivered five motor trucks of various sizes to the Greenwood Cemetery Association of New York city. This consignment came as a repeat order, there having been three Garfords doing landscape and grading work.

Questions Answered and Communications

Puzzled.....Vancouver, B. C.
W. J. McAnerny.....Sayre, Okla.
Leslie W. Levy..Brown's Town, Jamaica
Tuck.....Memphis, Tenn.
Charles A. Greene.....Gage, Okla.
F. Hale Gregg.....Marlin, Texas
A. Brucker.....Cropsey, Ill.
A Reader .....Benson, Minn.
Hubbard Cain.....Kosciusko, Miss.
George Tubble.....Sumter, S. C.
Herman Metzig.....Berlin, Wis.
H. .....Canton, Kan.
Joseph C. Dismore.....Cincinnati, O.
T. .....Memphis, Tenn.
Reader .....Chester Hill, Ia.

Cyclecar Section

Cyclecar.....Moline, Ill.
C. F. H.....Indianapolis, Ind.
Lawrence McCandless.....York, Neb.

The Readers

PISTON IS STUCK IN THE CYLINDER

Two Methods Given for Forcing the Ring Back in Its Groove

VANCOUVER, B. C.—How can one loosen the pistons in the cylinders when they have been allowed to slip up too far in the cylinder so that the top ring springs in the combustion space above the level part of the cylinder, making it quite impossible to withdraw the pistons? This happened with three pistons in a Flanders. I have heard of a cure with a model 22, 1910 Stoddard-Dayton, and another with a Chalmers. Is there not some method without destroying the engine by using force?—Puzzled.

In Fig. 1 is shown one method of forcing the ring back into its groove. The spark plug is removed from the cylinder and in its place is inserted a device similar to that shown at A. This is nothing more than a piece of metal that will screw into the spark plug opening, and which has passing through it a piece of pipe. Over this pipe is slipped a hose, the other end of which is attached to an air pump. Air is forced into the cylinder until the piston can be forced down.

To facilitate matters do not allow the upper ring to rest against the cylinder extension. If air pressure will not push the ring back, try forcing the ring on, with a screwdriver. To do this the cylinder plugs should be removed. Two screwdrivers are inserted and their edges pushed against the ring to force it back and at the same time someone should attempt to force the piston down. While you are holding the ring in its groove with the screwdrivers the piston should be given a sudden push downward and at the same time the screwdrivers removed. Both these methods have been tried and resulted successfully. Breaking the ring or piston or both should be the last resort.

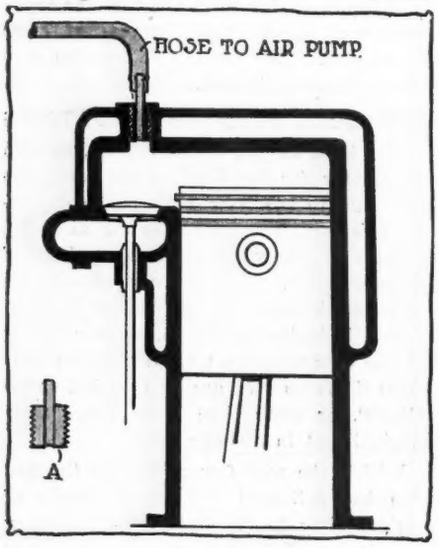


FIG. 1—PISTON STUCK IN CYLINDER

Protruding ring is forced back into its groove by compressed air

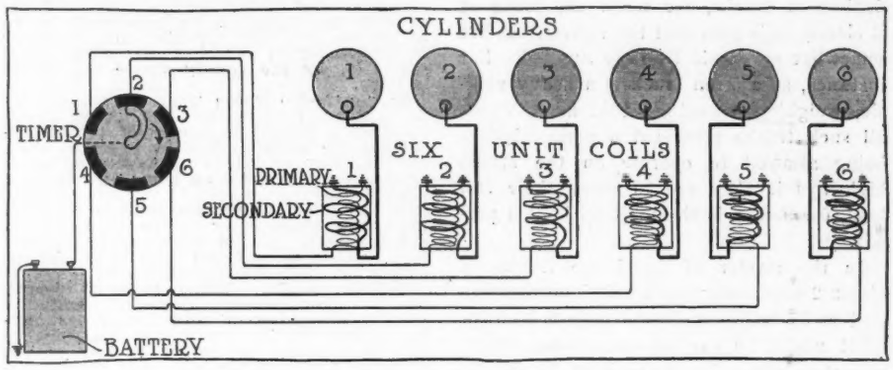


FIG. 2—WIRING OF SIX-CYLINDER FORD

Car first made in 1906 has six unit coils. The battery wiring only is shown above

WIRING OF 1907 SIX-CYLINDER FORD

Six Unit Coils and Timer Comprises the Battery System

Sayre, Okla.—Editor Motor Age—Please tell me how to wire a six-cylinder Ford, 1907 model, with batteries only.—W. J. McAnerny.

Fig. 2 illustrates connections employed on the six-cylinder Ford car for 1907 model. The battery system employed six unit coils and a timer. A wire from the battery is led to the timer arm and the other battery wire is grounded. The commutator has six segments and from each segment a wire is led to a post of the coils. This post has attached to it one end of the primary winding, the other end of the primary winding being led to the vibrator and grounded. The high-tension winding of the coil is shown heavy lines. One end of the secondary winding is grounded and the other end leads to the spark plug. The motor should fire 1, 2, 3, 6, 5, 4, so the wires from the timer should lead in order to those cylinders.

PISTON RINGS IN LINE CAUSE LEAK

Condition Remedied Easily—Speed of Hudson Roadster

Brown's Town, Jamaica—I have a Hudson model 20, 1911 roadster and find that the compression in one cylinder is poor. I have ground the valves and am satisfied that they seat properly. Have also examined the valve stems for sticking and think that the engine is free from carbon. The valve springs also appear stiff, and I have every reason for thinking that pistons and rings are in good condition, the car having done only 2,000 miles since they were examined. I have also examined the spark plug seat and compression cups for leaks.

When I adjust the tappets on this cylinder as close as the others there is little or no compression, while if I slacken off a great deal it is decidedly better, though not as good as the other three, and of course results in an objectionable tapping noise. Why should I have to set these valves with more clearance than the others, and is the trouble likely to be caused from wear in the cam or camshaft?

2—How many miles per hour is this car supposed to do on the direct drive?—Leslie W. Levy.

1—The fact that you are sure the valves of that cylinder are seating and that none of the cylinder plugs leak, leads one to believe that the trouble is with the piston or piston rings. The latter may not necessarily be worn but the ends may be in line as shown in Fig. 3. This condition will permit the compressed charge to work by the rings.

It is not a difficult matter to remove the cylinders and examine the rings and then turn them around so that the ends do not coincide. At the same time fit the piston by removing it and placing it in the cylinder previously inverted. There should be no perceptible side play between piston and cylinder wall.

2—According to the Chicago agent, this car is supposed to travel 55 miles per hour when new.

MOTOR RUNS WITH SWITCH CLOSED

Carbon Deposit on Piston Head a Common Cause

Memphis, Tenn.—Editor Motor Age—I would like to be advised as to whether or not a large flywheel retards the quick pickup of a motor when it is running idle and throttle suddenly opened, every adjustment being correct.

2—The motor I refer to is a Thomas 6-40, 1911 model, cylinder dimensions 4¼ inches by 5½ inches. This motor continues to turn over a good while after the current has been switched off after racing the motor. Does Motor Age think the sustained momentum is brought about by the large steel flywheel, which, I think, is 24 inches in diameter and about 4 inches in width. I might say that the compression in all the cylinders is good and that the motor comes to rest no sooner if the throttle is left open, after switching off. Is it likely that this condition is brought about by the timing of the intake valves? These valves, by the way, have never been changed from the factory setting. I do not object to the condition described, only I have not noticed the same effects in other motors—that is, those of other makes.

3—Recently a friend raised the question of breaking in a new car. The theory was advanced that a brand new car should be taken out on the road and put through some rough work to get the kinks out. The car in question is a Packard 48, latest model. Please set my friend aright.—Tuck.

Clearing House

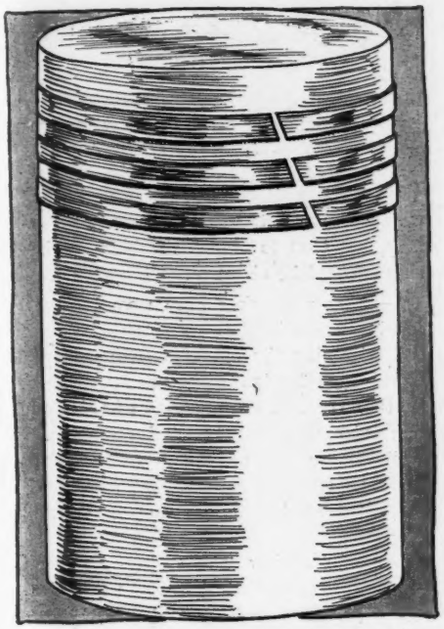


FIG. 3—RINGS IN LINE CAUSE LEAK

Compression makes its way along the channel formed by the rings' ends

Modern motor cars have the flywheel designed so that it will retard the initial motor speed as little as possible. A flywheel that is too heavy for the motor will of course make acceleration difficult, but such design is not found on cars of to-day.

2—Although you do not state whether the motor just turns over or whether it fires after the switch is closed, Motor Age believes the latter is the case. The former is hardly possible, as the frictional resistance of the pistons is very great and great enough to retard the movement of the flywheel. If the motor fires with the switch closed the usual cause is given as carbon being present on the cylinder head and piston. This carbon is hot or incandescent and sufficient heat is given off to ignite any incoming gas.

3—Your friend evidently has forgotten that Packard cars receive all the necessary road work before leaving the factory. All the parts are worked in and adjusted before the buyer receives the car.

TUBE BLOWS LEAVING CASE INTACT

Reader Has Peculiar and Uncommon Experience—Defective Tube

Gage, Okla.—Editor Motor Age—I had a peculiar experience the other day and would like to know if Motor Age ever heard of a similar one I had my car heavily loaded and was crossing a small bridge when I had a blowout. When I got out to examine the damage done, found the casing intact, about a 4-foot hole in the tube, and the inner ring was blown over the bead on the steel rim, and I had to remove the wheel to get it back. I tried to pry the ring back but could not come anywhere near getting it over the bead. The ring was to all appearances all right.—Charles A. Greene.

Your experience is not very common, but a number of cases are known where inner tubes have blown and pushed the casing off the rim without injuring the casing in any way. However, the cause usually is due to a defective inner tube. The tube will become hot just at this time of the year and the weak spot naturally will give way first. In your case the weak spot seems to have been unusually long, perhaps 6 inches or more.

CARBURETER MIXTURE IS TOO RICH

Cutting Down Fuel Supply May Cause Better Pulling Motor

Marlin, Texas—Editor Motor Age—I have a Ford model T touring car. I have driven it 6,529 miles. The motor will not pull any better when the throttle is open half way or when the spark is retarded. When climbing a hill or running through sand the motor will knock if the throttle is open a little way and the spark retarded. The motor does not heat up very much. After the car had been driven 3,853 miles the carbon was cleaned from the cylinders and the valves were ground.—F. Hale Gregg.

Perhaps you open the throttle too wide suddenly. That is, you feed the motor too much fuel at once. This practice causes what is called a fuel knock. Granting that you feed fuel properly, the poor performance may be due to too rich a mixture being fed to the cylinders. Cut down the fuel supply gradually by closing the needle valve of the carbureter a little. Do not close it too much at once, but close it a little at a time and no doubt an improvement will be noticed. When the motor is running properly do not close the valve any more.

WORKING ON NOVEL MOTOR DESIGN

Admires Air-Cooled Two-Cycle Engine-Power of This Type.

Benson, Minn.—Editor Motor Age—What is the best, over or underslung?

2—About what horsepower would a four-cylinder, two-cycle, 4-inch bore and 5-inch stroke motor develop?

3—What is considered the best cooling by air, ribs like the Franklin or rings all around?

4—Would copper rings, fitted in grooves and brazed therein, be all right? Will it not cool better than integral cast iron?

5—Will a 36 by 4-inch wheel ride as well as a 40 by 4-inch?

6—Can one oil drive to control of all speeds, radial revolving pump give as much power and speed as gear?

7—What does Motor Age think of hydraulic transmission as above?—A Reader.

1—Both overslung and underslung frames have their advantages and disadvantages and Motor Age is not in a position to decide which is the better.

2—About 24 horsepower at 1,000 revolutions per minute.

3—Franklin rib design is well fitted to the blower cooling that is used on this car. The other type is for motors without a blower, as a rule. The ribs should be in the line of the cooling air draught.

4—This construction is too expensive and does not cool as well. The thermal connection between the two metals can not be made close enough, although the copper will radiate more heat it will not conduct away from the cylinders as well.

5—The 40 by 4-inch wheel will ride easier.

6—By very expensive construction it might be possible, but it is far from advisable as a commercial proposition.

7—For heavy hauling on motor trucks it might do.

CASTOR OIL USED IN RACING CARS

Marketed Lubricating Oil Suffices for Ordinary Motors

Cropsey, Ill.—Editor Motor Age—What was the object of Jules Goux in using castor oil in the gasoline?

2—About how much castor oil did he put in a gallon of gasoline?

3—Would castor oil carbonize the engine?

4—Would it be a benefit to all motor cars?—A. Brucker.

1 and 2—Jules Goux did not use castor oil in the gasoline, but used the oil just as ordinary lubricating oil is used.

3—Castor oil will carbonize a little.

4—Its use is thought better for racing cars which must attain great speed, but this oil is not necessary for ordinary motors and also would bring the yearly oil bill to a very high figure.

Gears Are Not Running True

Kosciusko, Miss.—Editor Motor Age—I have a 1911 model Marathon car and have trouble with high and intermediate gear wearing and only half of the teeth wear all around the cog. Could it be that the shifting rod needs adjusting or that the finger on the shifting lever is worn? The gear that the above gear works with is not worn at all.—Hubbard Cain.

This is a most unusual state of affairs for the possible causes seem to be a countershaft out of line or the shifter shaft out of line. These shafts are parallel to one another and the reason the gears have worn excessively on one side is because one or both of these shafts is not running true. Motor Age suggests that you take the car to the nearest Marathon agency and let them examine the gearset and ascertain the trouble.

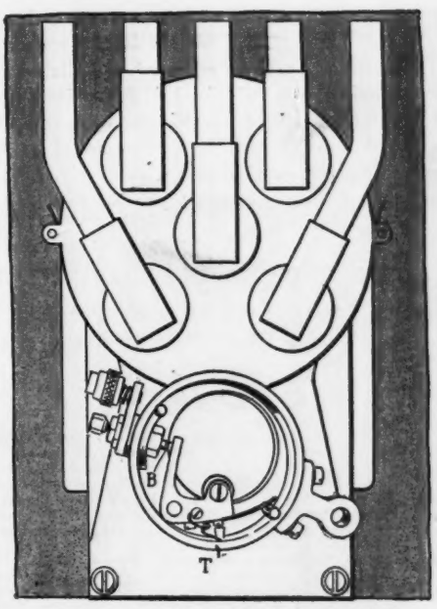


FIG. 4—ADVANCING SPARK ON A KINGSTON

Breaker box should be in position shown. Points B separate with piston on dead center

LOW-BUILT CARS HOLD THE ROAD

To Drive in American Grand Prix Register with A. A. A.

Sumter, S. C.—Editor Motor Age—Is it necessary to take an examination in order to enter the grand prix race?

2—The lower one builds a car is it safer for racing?—George Tubble.

1—If you are referring to American races, it is necessary to be registered with the American Automobile Association. This does not require an examination.

2—Yes, because then the center of gravity of the car is lowered, which makes it easier for the vehicle to stay on the ground, especially when taking turns.

READER WANTS SPARK ADVANCED

Kingston Magneto Fires With Piston on Dead Center

Berlin, Wis.—Editor Motor Age—How can I advance the spark on Kingston high-tension magneto employed on a Little car? I have loosened the shifting arm from the timer and worked the timer by hand, and there seems to be a bumper on the inside of the timer which prevents it from advancing. At present, if I fully advance the spark, it will spark just when the pistons leave the dead center.—Herman Metzig.

The Kingston magneto of the Little car is shown in Fig. 4 with the breaker box uncovered. When the magneto is advanced fully the breaker box T should be in the position shown. If it is not then remove the shifter arm and bend it until the breaker box is in the position shown with the spark lever fully advanced. At this point turn over the motor until the breaker points are separated fully and then with a thickness gauge or similar tool measure the opening. The points should not be more than $\frac{1}{32}$ inch apart. If the points are the correct distance apart and the breaker box is as shown, then the trouble may be with the magneto gears being wrongly reset. Previously the magneto may have been removed and in replacing the magneto gears were made to mesh improperly. If this is the case the magneto should be removed and the motor turned over until No. 1 cylinder is at the top of the stroke and ready to fire. While in this position the magneto should be reset with the distributor arm on No. 1 segment and the breaker points B just beginning to open.

COST OF OPERATING FORD LIVERY

Not Profitable at 10 Cents Per Mile—May Change Carbureters

Canton, Kan.—Editor Motor Age—I have a Regal roadster, motor 3⅞ bore, that will not throttle down satisfactorily. It runs as if designed for a racer, but will die if slowed down as low as probably 700 or 800 revolutions per minute. It is equipped with a Schebler 1¼-inch model D carbureter. Would Motor Age advise substituting a 1-inch carbureter to gain flexibility, not caring for extreme speed? Compression in this motor is not first-class, but do not think it so bad as to cause all the trouble, as I have seen many with worse compression that ran pretty well.

2—Are the patented piston rings known as Leak Proof of as much advantage as is claimed for them? A salesman recently told me that the usual practice was to put only one at the head of each piston, leaving the old ones below. Is this correct?

3—On testing a four-unit coil, we find that when contact is made through one coil a small spark is given from the secondary wire of the coil adjoining it. What is the cause of the coil not in the circuit giving off a spark? What is the remedy?

4—Please give estimate of cost per mile to operate a five-passenger motor car on country roads, including the original cost of the car and upkeep during the usual life of a car. The grade of car to be Ford or E-M-F 30, the ones commonly used for livery. Our country is mostly level, with dirt roads, but at times very hard on tires, as the mud dries hard and sharp. It has been claimed that one can make good at livery at 10 cents per mile, but liverymen say no. Yet there are lots of people who keep the price down to that and less. I claim that one cannot hope to have enough at the end of the life of a car, after paying the driver and paying the expense of repairs, to replace with a new car. I would like to hear from liverymen in different sections as to what they get for driving one, two, three or four passengers, and what conditions they are under. Our drives are mostly short, 7 to 15 miles.—H.

1—The Regal should throttle lower than 800 revolutions per minute. The trouble seems to be with your carbureter adjustment. The method of adjusting the Schebler model D was given in Motor Age issue of June 12, page 30. If you desire a more flexible carbureter than the model D, the Schebler agent in Chicago states, the model L should be used, the size to be that of the opening of the intake manifold.

2—Motor Age has not tested these rings and therefore cannot give you definite data as to their efficiency. As to using one Leak Proof ring on top and the old rings below. The agent for the rings in Chicago states that one ring on top will help, but that to obtain the best result all rings should be changed.

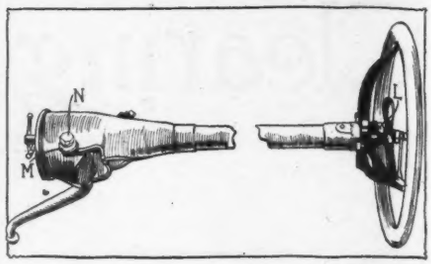


FIG. 5—ADJUSTMENT OF RAMBLER STEERING

3—That a spark occurs may be due to self-induction in the secondary wire of the coil adjoining the one of which you speak. If the high-tension wires are touching one another there is a possibility of this condition existing. Separate all the wires in the ignition system and at the same time look for poor insulation. No doubt with the wires separated and the insulation in good order the trouble will vanish.

4—An interview with a garage owner in Chicago who operates Fords as taxicabs

Cyclecar Problems Arouse Great

GIVES CYCLECAR SEATING METHODS

Reader Advocates Side-by-Side Arrangement and Dash Fuel Tank

MOLINE, ILL.—Editor Motor Age—The seating arrangement for cyclecars proposed by "Reader" in the July 3 issue of Motor Age, page 35, will, I think, find a very large number of admirers. The double seated car will eventually gain the upper hand in this country, and the only way to obtain it with a 36-inch tread is to inclose the running boards. This very same thing is now done in foreign expensive motor cars, as Motor Age pointed out some weeks ago.

But to return to the cyclecar: its outward appearance is bound to be a great selling point. A gasoline tank, located over the cylinders, as in motor cycles, is unsightly in a cyclecar; moreover, the tank is of small capacity and makes easy access to the cylinder heads for valve grinding or adjustment more difficult. In order to obtain consistent streamlike effect, motor car practice might be followed in an inexpensive manner. Give the front of the car a fairly strong V-shaped wire screen, imitating the radiator of the motor car; this will cut the air resistance, protect the engine and give free admission to the cooling air.

Secure the screen to a strong frame of light tubing, to support the hood. Provide an ordinary hinged hood as in motor cars, protecting the engine, yet giving free access to it on either side without lifting the hood off completely. Let this hood merge gradually into the cowl dash, thus allowing for an invisible and inexpensive dashboard. Place the gas tank within the cowl, where it can be made of larger capacity, and will feed by gravity on all grades as well as when located above the engine. Granting a 100-inch wheelbase as a minimum for easy riding, ample room for this arrangement seems provided, allowing besides for tool room under the seats, and a little compartment behind the seats for small baggage, a convenience not to be overlooked for excursions into the country.

As for the driving mechanism, simplicity and inexpensiveness must be the rule. The steering by wheel and cable seems best from every viewpoint. What kind of clutch and differential action seems preferable is not as yet quite clear to me. The driving from countershaft to wheels, however, will be by belts. It has been proposed to transmit the power from engine to countershaft by chain. An ordinary chain as used in motorcycles and trucks is noisy. A noiseless chain, as used now in motor cars for driving magnetos, etc., is perhaps too expensive. Why not have friction transmission? Its efficiency has never been questioned, but in high-powered cars it has never been popular on account of the large disks that naturally are required. Would it not be admirably adapted to a low-powered car, requiring only small disks, while besides it is absolutely noiseless and inexpensive? It needs no attention in the way of lubrication as a gear transmission does; there is nothing to get out of order; there are no links to break as in a chain; the friction material ought not to wear out quick, and if it does, its replacement is a small matter.—Cyclecar.

resulted in the belief that you could not operate profitably at ten cents per mile. The garage in question is the Barry garage and the cost for operation is two cents per mile which includes fuel, oil, tires and fire insurance. The owner of this garage stated that the cost for operation, including driver and repairs will be about six cents or seven cents per mile, and if depreciation is brought in the cost will come a little higher. The Barry garage charges 40 cents per mile and the profit is not to be boasted. Further, these taxicabs operate mostly on city streets. Perhaps some readers have had experience with Fords or E. M. Fs. for livery, and may help you.

HIGHEST PRICED CAR IN EUROPE

DeDion and Palladium Companies Building Eight-Cylinder Chassis

Cincinnati, O.—Editor Motor Age—What is the highest priced European touring car and its price, not including import duty? Also, wnat is its bore and stroke and number of cylinders?

2—What is the highest priced French touring car and its price without duty? What is its bore and stroke and number of cylinders?

3—Does DeDion Bouton make stock eight-cylinder touring cars? If so, what is the bore and stroke of its eight-cylinder models and the price of the car without import duty?

4—What French motor car makers manufacture eight-cylinder cars?

5—What is the fastest speed ever attained by an American car?—Joseph C. Dinsmore.

1—The highest priced European touring car is the six-cylinder Napier, which sells for 1,235 pounds, or about $6,150, not including import duty. The six cylinders have a bore of 127 and a stroke of 127 millimeters, or 4.953 by 4.953 inches.

2—The highest priced French touring car is the Lorraine-Dietrich, which has a four-cylinder motor 125 by 170 millimeters, or 4.875 by 6.63 inches.

3—The DeDion Bouton makes stock eight-cylinder touring cars. The bore of the motor is 74 and the stroke 130 millimeters, or 2.886 by 6.07 inches. The price of the chassis only without import duty is 532 pounds, or about $2,600.

4—A number of French makers are experimenting with eight-cylinder motors. The only definite information Motor Age has is that the DeDion Bouton and Palladium are building eight-cylinder cars.

5—Wilcox in a National drove a mile in 40.32 seconds, or at a speed of over 89 miles per hour.

CAR GOES ONLY 7 MILES ON GALLON

Advised Not to Change the Gear Ratio to Decrease Fuel Bill

Memphis, Tenn.—Editor Motor Age—Our 1911 model M 6-40 Thomas Flyer, equipped with Rayfield carbureter and geared 3 3/7 to 1 on third or high gear, seems to burn a good deal more gasoline than one would think necessary for a motor of this size and power. The cylinder diameters are 4¼-inch bore by 5½-inch stroke. Now, with all the valves tight, and ignition timing as fast as consistent with touring car practice, and the carbureter set so as to give the most powerful mixture, we only get about 7 miles per gallon of gasoline. Does this seem to be in line with other motors?

2—I would like to know if a 3 to 1 gear, instead of 3 3/7 to 1, would enable us to get more mileage per gallon. It would not take much more effort on the part of the motor to work with this gear ratio.

I might mention that the average temperature of the water in the radiator on hot days is 190 degrees Fahrenheit. This should be conducive to economic running, I think. I do not allow water to circulate through the carbureter jacket during the summer, nor do I use the hot-air connection to the exhaust manifold. The clutch does not slip; the brake does not drag excessively. The wheel bearings, in fact, everything, is in ship-shape, but I cannot understand the excessive consumption of gaso- Can Motor Age help me?—T.

1—Other owners of the model M Thomas state that only under ideal road conditions will the car give more than 7 miles on a gallon of gasoline. A talk with these owners shows that your mileage per gallon is not to be considered too great for the car. In one instance this model gives only 5 miles per gallon, so it seems reasonable to suppose that your car is doing well.

2—Motor Age advises that you do not change the gear ratio unless you are able to determine the maximum efficiency of the motor, and with your car the change would not give much better results. The maximum efficiency means the revolutions per minute at which the most miles per gallon are obtained. After determining this one should fix the miles per hour at which the car is desired to be run normally, and then the proper gears used. That is, if at 1,000 revolutions per minute the maximum efficiency is reached the car speed at this motor speed is determined by the gear ratio. In order to run the car at, say, 25 miles per hour with the motor turning over at 1,000 revolutions per minute, or its maximum efficiency, the gear ratio will have to be 3½ to 1 with 38-inch wheels, which the Thomas uses.

Interest Among Motor Age Readers

NO DIFFERENTIAL ON CYCLECAR

Equalizing Gear Not Necessary When V-Belts Are Used

York, Neb.—Editor Motor Age—Is a differential gear necessary when V-belts are used on a cyclecar?

2—What would be the cost of a cyclecar with a spiral cyclecar motor, side-car wheels, and with a 98-inch wheelbase, friction gear and clutch?—Lawrence McCandless.

1—No. The outer belt climbs the pulley to greater diameter and acts as an ideal differential in itself. Use long belts and large size pulleys and the effect will be automatic.

2—The McIntyre Co., of Auburn, Ind., is putting out a cyclecar of the description you mention, at $375. No clutch is fitted, however, as this is not necessary with friction drive. The wheelbase also is 100 inches.

Plan of Bedelia Cyclecar

Indianapolis, Ind.—Editor Motor Age—What is the general plan view of the Bedelia? I want the frame shape and how seats are arranged, also the width of the front part compared to the back. Can you furnish me with such a view?—C. F. H.

The Bedelia, looked at from the top, is shown in Fig. 5, which is a reproduction from the London Cyclecar. This is from a photograph and shows the size relations with fair exactness. The front or hood part shows the full width of the main frame of two wooden members which run to the rear of the car. Curved members at the sides of these bring the body part to its full width, and add to the frame strength. The new fenders are shown very well. The rear end of the car is pointed to decrease wind resistance, the shape of the rear end being much more important than that of the front for this item.

The seats are of the hammock type slung between two cross-members curved to the proper shape, and are quilted for extra comfort. Those who have ridden in this type of seat speak of its great comfort, as the hammock idea absorbs sidesway as well as vertical shocks.

The illustration also shows the position of the jackshaft and the belt arrangements. The low-gear pulley is seen outside of the ones in use on the jackshaft. This one is not frequently used.

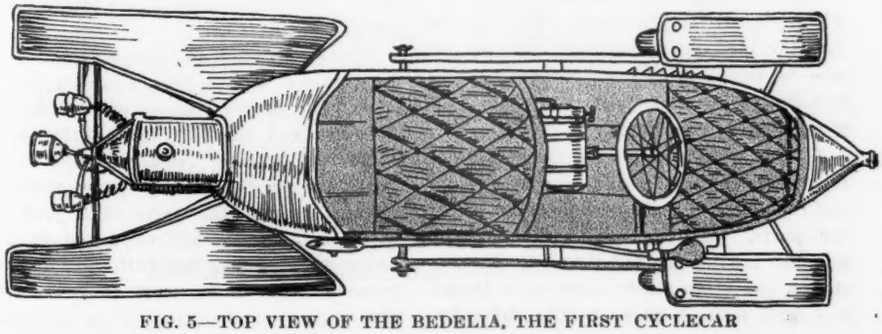


FIG. 5—TOP VIEW OF THE BEDELIA, THE FIRST CYCLECAR

Adjustment of Rambler Steering

Chester Hill, O.—Editor Motor Age—Will Motor Age kindly inform me how the adjustment is made on the steering gear of a Rambler car?—Reader.

You do not mention the model of Rambler, so the 1913 has been taken. This is shown in Fig. 5. To eliminate up-and-down play in the steering, the adjusting nut L is provided. Loosen the lugs on either side of the steering post and turn the adjusting nut to the left until the play is taken up. The lugs should be replaced then. To remove side play, back off the lock nut N by turning it to the right. Then tighten the adjusting nut M until the desired amount of play has been taken up, after which the lock nut N should be screwed down, or turned to the left.

The Motor Car Repair Shop

Removing Steering-Arms

IN Fig. 2 is shown a means and a method of removing steering-arms from front-wheel spindles. It consists in the use of a specially formed, fork-shaped wedge, which may be driven between the shoulders on the steering-arm, and the eye E of the steering spindle, as illustrated. Of course, before applying this tool, it is necessary to remove the nut which secures the arm in place.

The joint between the end of the steering arm of a car and the steering spindle usually is a tapered one, as indicated by the dotted lines D; so that after the nut is removed a little force properly applied as shown is all that is necessary to loosen the arm in the eye. In making a tool for this work, one should endeavor to form the tool so that the wedging force takes place at about the center of the steering arm, near the points T.

There are many similar joints or connections on a motor car that can be loosened very readily with this sort of a tool, such as engine and transmission gears and couplings, from the ends of their shafts. But when using this type of instrument one must always be careful to avoid bending the shafts. On a steering arm, as illustrated, there is no danger; but in removing the coupling from a magneto, or gear from a cam or crankshaft, considerable care should be exercised.

Cutting Valve Springs

It often is necessary for a repairman to cut a piece off a coil spring, and a common erroneous method of doing it is to use a chisel and a hammer for the purpose. The result is that in the great majority of cases the edge of the chisel is ruined before the spring is cut. Spring wire is very hard, and generally much harder than is practical for the edge of a chisel.

The correct way to cut a coil spring is on the edge of an emery wheel. Then after the spring has been cut, the last coil may be readily beveled off and flattened down smoothly against the next coil by pressing the end of the spring against the side of the emery wheel, and holding it there until it is of a dull red color, whence it will bend readily into the position desired. To retemper, the spring should be heated a dull red heat and quenched in fish oil.

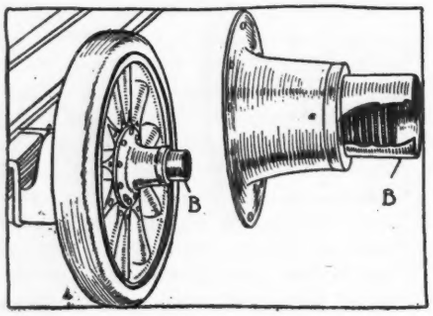


FIG. 1—METHOD OF PROTECTING HUB THREADS

In cutting a spring, one should be very careful not to allow a coil of the spring or the end to get caught between the rim of the emery wheel and the rest. Serious injury has been done to workmen from broken emery wheels, etc., as a result of thoughtlessness or carelessness in this respect. It is for this reason, and perhaps because the spring may be wider than the edge of the emery wheel, that one is advised to use the side of the wheel to bevel and flatten down the end of a spring.

Protecting of Hub Threads

Protecting Hub Threads

In removing a wheel of a motor car one must always be careful not to damage the threads on the end of the spindle. A motor car wheel, especially on heavy cars and commercial vehicles, is generally very heavy, and a good load for one man and often for two men, to lift off one of the spindles. Unless precautions are taken, therefore, to protect the threads of the spindle, it is a very simple matter to burr or damage them to such an extent that much difficulty might be experienced when the time comes to replace the nut upon them.

In Fig. 1 is shown the means employed by a large motor-bus repair shop to prevent damage to the spindle threads when wheels are being removed for inspection, lubrication or repair of the bearings. The device used consists simply of an old bronze bushing B having an internal thread designed to fit the thread of the spindle loosely. This bushing is screwed onto the end of the spindle after the retaining nut has been removed. Thus when the wheel is removed from the spindle, if it happens to drop down onto the threaded end of the spindle as it may, no harm can be done to the threads themselves. This bushing is left in place while the wheel is removed, and during the time that it is again being mounted on the spindle; and when properly applied and ready for the nut, the bushing is removed and the nut may be replaced. Thus considerable time and trouble are saved the workman.

Replace Nuts Carefully

A little more care on the part of junior repairmen, amateurs and apprentices, in the replacing of nuts and bolts of motor car parts, will eliminate much damage and the trouble caused thereby. For instance, one often starts a nut on a thread and finds that it goes on with difficulty.

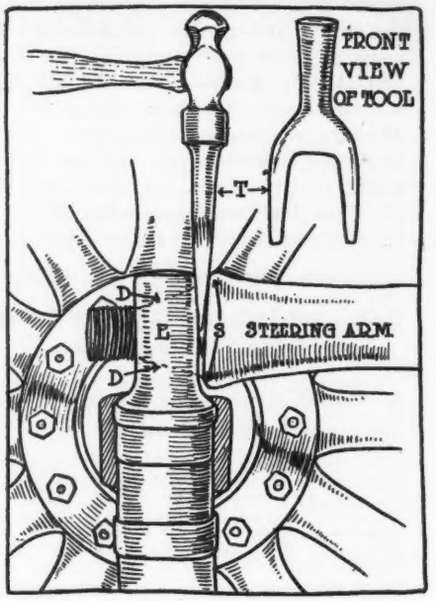


FIG. 2—REMOVING STEERING ARM FROM SPINDLE

The unskilled amateur or apprentice immediately takes up a wrench and seeks therewith to overcome the difficulty. The result is that the nut is given a few turns more with comparative ease, then it stops and cannot be turned farther without considerable effort. If the nut happens to really be a loose fit it may be screwed up tight; and the unknowing workman will be satisfied that the nut is drawn up tight and pass on to the next job; later when the car is in service, this nut whose threads have been destroyed may loosen up and come off with disastrous results no doubt.

Starting Nuts

If a nut does not start on its thread easily, there is a reason for its not doing so. It may be that the thread is burred or slightly damaged; it is possible the nut is not squarely applied and may be cross-threaded; there may be dirt in the threads or a shred of waste; or if the nut is a new one or an old one being fitted to a new shaft or belt it may be too tight. The thing to do is to find out which of these is really the cause of the difficulty before the wrench is applied to the nut.

If the threads are damaged they should be repaired with a thread-cutting tool or die of the proper size, or with a file. As for dirt and the like in the threads of either the male or female portion of the parts in question, every good mechanic always inspects the parts of a joint for such obstacles instinctively, and it is a habit that should be cultivated by all persons inclined to work on mechanical devices.

Housing the Motor Car — The Garage for the Monied Class

INDIANAPOLIS, Ind., besides being proud of the fact that a large share of the motor cars of the country are produced there, may boast also of at least one garage which seems to have a sense of hearing. This garage is owned by Frank Fox, who entered the Fox special in the recent 500-mile race. When a car approaches this garage and gets within 5 feet of it, the door for which the car is headed opens automatically, and after the car has passed the door, on the inside, it closes. Electricity does the trick. As will be noticed by referring to the upper illustration on this page there are four such doors.

Seemingly the Fox garage is a one-story building, but in reality it has two floors. Right here is another point of thoughtfulness on the part of Mr. Fox's architect. The lower floor communicates with the home of the owner by a tunnel and as the owner boastfully states "I can coal up the garage furnace and get back to my home, without passing out doors." He uses the tunnel, of course.

The garage building is of terra cotta brick and is 34 feet long and 16 feet wide, making the floor roomy enough for handling four motor cars. The upper story, or that on a level with the street, has a cement floor with one large pit. The cars that enter occupy the three doors on the right, in order, in the event that no repairs are necessary. However, if any car needs attention it is driven into the first compartment and over the pit, so that work on the car may begin immediately. The pit has a cement floor, beneath which, is a space 42 inches wide and about 12 feet long for the storing of supplies, which are not for immediate use.



GARAGE OF FRANK FOX, INDIANAPOLIS, IND., HAS ELECTRICALLY OPERATED DOORS

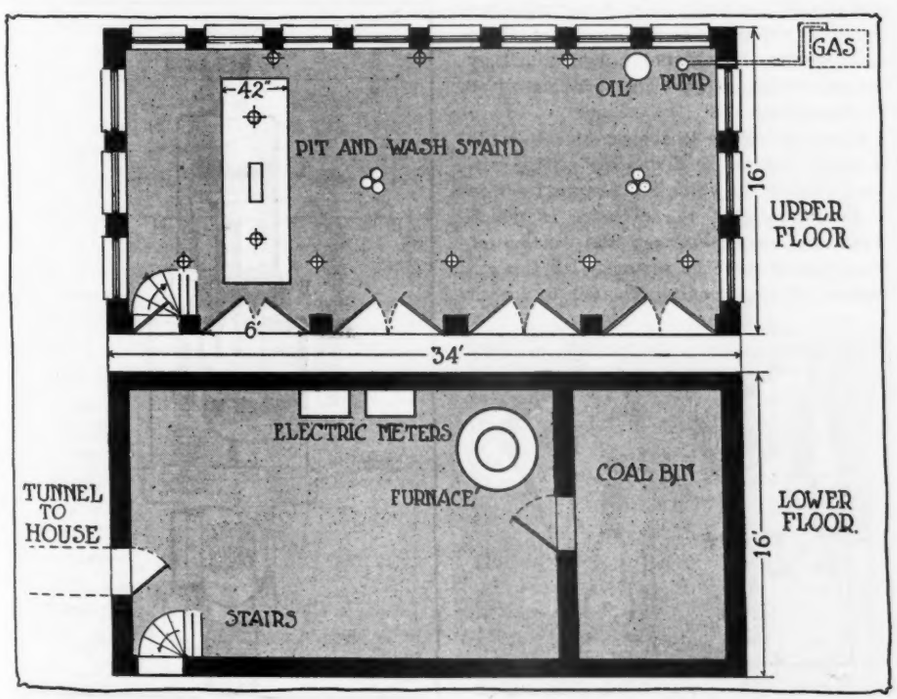
Cars Washed on the Pit

In the center of the pit is a drain and all four cars are washed on the one pit. It will be noticed from the floor plan below that there are two light clusters over the pit, so that washing at night is not made difficult. A number of drop lights are provided also, for use in the pit, when car examination is necessary.

Nothing seems to have been forgotten in the lighting of the garage, for besides fourteen windows on three sides the electrically operated doors have windows at their upper portions. Since much work is done at night, tungsten lamps have been arranged in clusters and in the form of drop lights.

For supplying four cars a 100-gallon gasoline tank is underground and about 25 feet from the building, the conventional fuel pump being used to bring the fuel to the garage. Next to the gasoline pump, which is in a corner of the building, is a 20-gallon oil tank.

In another corner of the room is a stairway leading to the lower floor. On this floor is the furnace and a huge coal bin. One filling of the bin is ample to supply the furnace for a year. Electric meters are located near the ceiling, and here also is the apparatus for operating the doors on the upper story. On the left of the illustration of the plan of the lower floor will be seen the entrance to the tunnel.



SHOWING FLOOR PLANS OF UPPER AND LOWER FLOORS OF THE GARAGE OF FRANK FOX—NOTE THE TUNNEL LEADING TO THE OWNER'S HOUSE

HUDSON INVADING EUROPE

Paris, June 25—F. O. Bezner, vice-president of the Hudson Motor Car Co. has taken up his residence in this city with the object of directing a business campaign for Hudson interests throughout the continent of Europe. Seen by a representative of Motor Age at his temporary headquarters 2 Rue Blanche, Mr. Bezner stated that a preliminary examination of the territory had convinced him of the possibility of doing good business throughout Europe. Hudson interests have been represented in England for some considerable time. The present move is an important one having for its object the sale of cars in all countries throughout continental Europe. Paris will serve as the headquarters from which to control this business.

The Accessory Corner

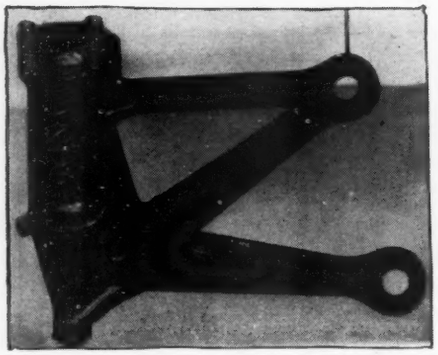


FIG. 1—LANDIS SHOCK ABSORBER

Auto-Signalite

A REAR signal which is operated by the driver of car and notifies the driver behind which direction the forward car will turn, is being marketed by the Auto-Signalite Co., New York. A lever is attached to a disk upon which are the letters L, R, S and D. These mean respectively left, right, stop and danger. When the driver of a car turns the lever to R the driver behind is notified that the car in front will turn to the right. Similarly the device may be made to show stop or right. When the lever is turned to D the conventional danger signal is shown at the rear. This device, shown in Fig. 2, holds also the license pad, which is illuminated, thus eliminating the ordinary taillight.

Fowler Deflector

The Fowler Lamp & Mfg. Co., Chicago, is offering a deflector for motor car headlights which prevents the light from being thrown higher than the center of the lamp. In many cities the use of glaring headlights is prohibited, but with the Fowler deflector the light is not thrown into the eyes of an oncoming driver. In addition to doing this, the deflector is said to spread the light over a greater distance both sideways and forward. The Fowler deflectors are sold at $5 to $6 per pair.

Breeze Flexible Metal Tubing

A new department has been in operation at the plant of the Breeze Carbureter Co., Newark, N. J., getting out a supply of flexible metal tubing, one type of which is shown in Fig. 8. This is made especially to take the place of the rubber gas lamp connectors and comes either with metal or rubber tips attached. A number of other styles of flexible tubing are offered; among them one designed for tire inflating. The latter sells for 25 cents per foot, while the tubing for gas lamp connectors sells for 40 cents per pair of 12-inch length.

Landis Shock Diffuser

The Landis Shock Diffuser, a product of the Landis Engineering & Mfg. Co., Waynesboro, Pa., is of the hydraulic type depending upon oil for its action. The absorber consists essentially of a piston operating in a bath of oil. On the rebound of the springs of a motor car the piston is forced against the oil which offers resistance but does not stop the movement of the piston completely. Thus, it causes the piston to come to rest gradually and this means that the springs of the car come back slowly.

The detail of the Landis diffuser is shown in Fig. 3. The casing contains a steel cylinder H, the movement of which is limited by the lugs M and S. The piston I operates in the cylinder H. The piston is connected to a rod D, by means of pin G. There is a hole through the piston at O, which is larger than the pin G. This allows a vertical movement of the



FIG. 2—AUTO-SIGNALITE

piston. The piston rod is connected to the link C by means of the steel pin B. The link is clamped on the face N to the arms which attach to the motor car springs.

When the spring of the car compresses, as shown in Fig. 3 at the right, the piston is carried upward and at the same time the ball valve P is opened. This action is said to produce a partial vacuum under the piston I which causes the cylinder H to move upward to the point determined by the projection on M. This enables oil to fill the cylinder.

When the spring of the car starts on the rebound, the rod D first seats on the piston I closing the valve P. The next action is the seating of the cylinder H which closes the space between the bottom of the cylinder and the piston, with the exception of the opening T. Oil is forced through this opening by the downward movement of the piston.

It is seen then that on the compression of the spring there is little resistance to the action of the piston, but on the rebound of the spring the piston pushes against a volume of oil which gradually gives way by leaving through the opening T. The diffuser as it appears ready for the car is shown in Fig. 1. Thirty dollars per pair is asked for these shock absorbers.

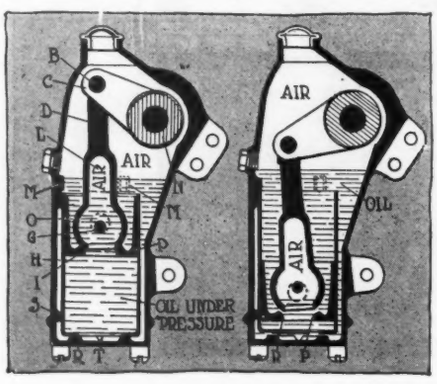


FIG. 3—CROSS-SECTION OF LANDIS SHOCK ABSORBER

Mayo Spark Plug Pump

The Mayo Mfg. Co., Chicago, has had on the market a spark plug pump, but the operation of this pump has been understood by only a few. Just how this pump forces air to the tires will be understood if reference is made to Fig. 4. The part, M, is screwed into the port occupied by a spark plug. On the suction stroke of the engine the metal piston, P, is drawn downward and at the same time the valve, V, opens admitting air into the combustion chamber of the cylinder. On the compression stroke of the engine the air in the cylinder is forced upward into the chamber, R, and then through an opening in the center of the piston, P, through the check valve, B, to the small chamber, H. On the next downward stroke of the motor, the air in the chamber, H, is compressed and at the same time this compressed air passes the leather-faced piston, L. It is allowed to pass because there is a flat side on the metal part of the piston, L. The air is now above the piston, L, and on the next upward stroke

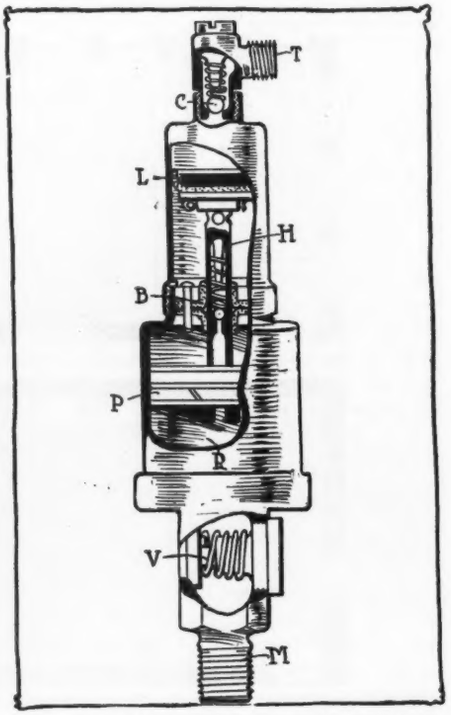


FIG. 4—INSIDE VIEW OF MAYO SPARK PLUG PUMP

of the cylinder piston the air is forced through the check valve, C, and the neck, T, which is attached to a tube leading to the tire valve. Thus it is seen that the air is compressed really before it reaches the tire hose. The pump will not work at high motor speeds and if the motor is raced the pump will lock automatically. The market price of the Mayo pump is $12 with the gauge.

Osborne Rim

A rim which is made in two parts and requires little work for removal has been brought out by F. M. Osborne, Anaconda, Montana. The rim is shown in Fig. 9. A and D are the two halves of the rim and M the end of a flat ring fitting over the junction of the two parts. The blocks C integral with the rim halves hold a wedge block H. The hole is for the purpose of permitting a bolt B to slip through as shown at the left. Here may be seen the relative positions of the parts and it is clear that by the removal of the nut, N, and the wedge block, the ring may be removed, in which case the halves of the rim separate. The only tool required to change a tube on this rim is a pair of pliers.

Hart & Hegeman Switches

The Hart & Hegeman Mfg. Co., Hartford, Conn., is offering a line of electrical switches for motor cars, the feature of which is the quick-break type. With this switch no current will flow unless the button is pushed all the way in, so that accidental pressure on the button causes no action. Another type of switch which is adaptable, especially to limousines, is the three-way switch. With this type the dome light is controlled either from the tonneau or from the driver's seat. The three-way switch sells for $1.20.

Packard Cable

A cross-sectional diagram of a piece of Packard ignition cable is shown in Fig. 6. This cable is marketed by the Packard Electric Co., Warren, O. Referring to the illustration it will be noted that there are six layers of rubber and braid. The portion represented by D, is wire composed of forty-one strands of No. 30 tinned copper. Over this wire is placed a black rubber covering, A, which is said to have a high dielectric strength. The next insulator is B which is made of rubber, and is vulcanized to the first layer. Then comes another layer of black rubber, C.

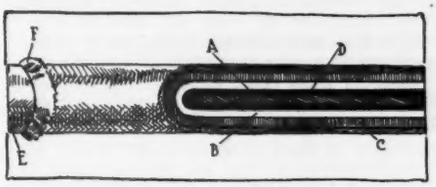


FIG. 6—SECTION OF PACKARD CABLE

Over the four rubber coverings is placed a brown braid covering, E, which is impregnated with a heat and water-proof enamel. The last covering is also of brown braid and is shown at F. All this covering is to insure against current leakage, and makes a cable which is an efficient means of conducting high-voltage current.

Johnson Shock Absorber

The Johnson Specialty Co., Chicago, is marketing a spring shock absorber under the name of Johnson. The device is shown in Fig. 5 at the left and installed on a Ford at the right. That on the Ford is a special type, but embodies the same design as the larger sizes. The Johnson shock absorber consists of two inter-coiled spiral springs. One of these springs is made to absorb heavy shocks and the other to absorb light shocks. In the center of these spiral springs is placed a third spring through which a bolt passes. Turning up on this bolt by means of a nut at the bottom of the device adjusts the tension of the spiral springs. All the springs are contained in a grease-packed case. In operation the rebound of the spring is prevented by the stretching of one of the springs of the absorber and if the rebound be too great the second spring comes into play. The Johnson shock absorber is made in sizes to fit any type of motor car.

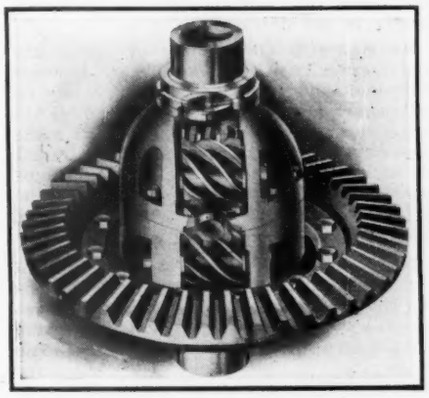


FIG. 7—M & S SPIRAL GEAR DIFFERENTIAL

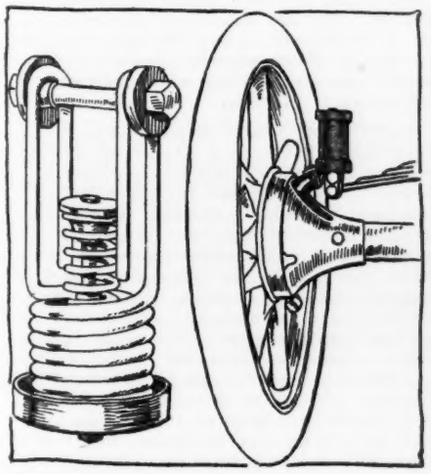


FIG. 5—JOHNSON SHOCK ABSORBER. FORD INSTALLATION AT THE RIGHT

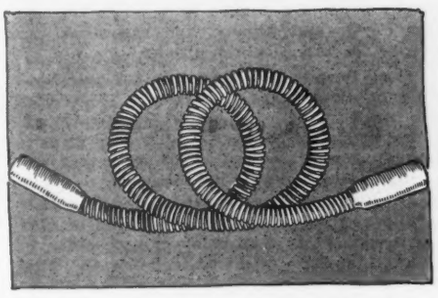


FIG. 8—BREEZE FLEXIBLE METAL TUBING

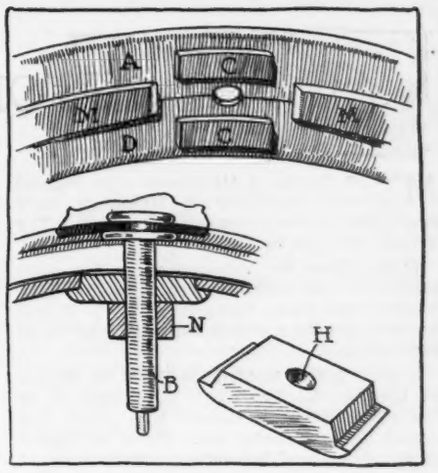


FIG. 9—OSBORNE TWO-PART RIM

M & S Spiral Gear Differential

The M & S Gear Co., Detroit, Mich., has brought out a new type of differential which is claimed to pull both rear wheels under any conditions. It is declared also that this differential will prevent side slipping or skidding.

This differential was designed by William F. Muehl, who states that the much desired action is due to the spiral gears used. These gears are cut at an angle of 45 degrees and their method of operation is similar to those in the ordinary bevel gear differential.

In Fig. 7 is shown a phantom view of the M & S differential. It will be noticed the upper gear in the collar has a squared end. This is for the insertion of the axle shaft. Another gear of this type, which corresponds to the bevel gears at the ends of the axle shafts, is at the other end of the collar. These two gears are in mesh with four other spiral gears, which correspond to the four bevels on the conventional spider differential.

Tests have been held recently. In one of these a wheel of a Kissel Kar equipped with this differential was placed in a mud hole. The other wheel was on dry ground. According to the maker, the wheel in the mud did not spin around, but instead pulled with the other wheel. Similar tests were performed with other makes of cars.

With the power applied evenly to both rear wheels, it is claimed that this form of differential will pull a 30 per cent greater load and give a greater mileage per gallon of gasoline. The maker further states that the use of a differential lock is not necessary and the results obtained are just as positive.



From the Four Winds



MOTOR Course at Minnesota—The regents of the University of Minnesota have sanctioned a motor engineering course. The tuition fee will be $10.

Motor Show for Vancouver—On the completion of the new Transportation building at Hastings Park, Vancouver, B. C., it will be opened with a motor show, August 30 to September 6.

Illinois' Oldest Motorist is 83—M. M. Miller, of Chatsworth, Ill., aged 83, claims to be the oldest man in Illinois who owns and drives his own motor car. He is an expert at the wheel and has driven many thousand miles without meeting with an accident.

Manitoba Has 3,592 Cars—The issue of motor car licenses to date in Manitoba shows that there are 3,592 machines in the Province of which number all but 400 are privately owned. The leading makes represented are as follows: Ford, 879; McLaughlin, 487; Overland, 234; Reo, 199; E-M-F., 174; Cadillac, 157; Hupmobile, 118 and Russell, 112.

Motorists Fill Ohio's Coffers—According to the statement of the Ohio motor department for the first 6 months of 1913 the receipts amounted to $348,038.09 or more than $50,000 more than the entire receipts of the department for the year 1912. The total number of cars registered up to July 1, 1913, was 73,200, while the number of chauffeur's licenses issued was 7,350.

Shakers Buy Motor Cars—The remainder of the members of Ohio's quaint Shaker settlement have gone in for motoring. The seventeen survivors of the colony recently sold their holdings near Cleveland for $324,000 and nearly every one purchased a motor car. The oldest among them is 82 years old and the youngest 51, but all are ardent motorists and including the women, skillful drivers.

Macon County's Proud Boast—Macon county claims to lead all the counties of Illinois, outside of Cook, in the number of motor cars. Statistics compiled from the assessor's records show that 961 cars are owned in the county and 700 in the city of Decatur alone. In the last census, Macon county was credited with 57,000 inhabitants. The value of the cars owned in Macon county is estimated at $1,250,000.

Motorists Supervise Road Oiling—Since the Sommers accident in which four members of one family were killed and a like number seriously injured, prominent St. Louis motorists have protested against the improper oiling of roads and the use of the powerful electric headlights. It is alleged that this combination is the cause of many accidents and should be remedied as soon as possible. The motor associations will see that the roads are properly oiled hereafter and also will endeavor to have a city ordinance passed that will prohibit the use of the electric light within the city limits.

America Leads France in Cars—A comparison of roads and motor travel in France and the United States supplies some statistics of value which also will serve to correct some misinformation that has found its way into print. France has 38,000,000 people, 365,000 miles of roads, and 75,000 cars; one car to each 520 people, and one car to a trifle less than every 5 miles of roads. The United States, with 90,000,000 population and 2,200,000 miles of roads has 1,040,000 cars; one for every 87 people, and for a trifle more than every 2 miles of roads. New York state, with 9,000,000 population and 80,000 miles of roads has more than 106,000 cars, or one to every eighty-five people and one to every three-quarters of a mile of road in the state.

Sequoia Park Open to Cars—Captain McCaskey, superintendent of the Sequoia National Park, announces that this park will hereafter be open to motor cars. There will be restrictions in the use of the roads to the Giant forest by cars, as is the case of Yosemite park, in the same state.

Antique Car Brings $5—The first motor car to be owned in San Angelo, Texas, sold last week for $5. It is a Packard, purchased many years ago. It was the first car seen west of San Antonio and attracted hundreds of persons from the entire countryside to see the new "horseless carriage."

Helping in Ohio—Through Senator C. J. Howard of Belmont county, Ohio, the state will furnish $150,000 for the improvement of the National pike through Belmont county. The money is a part of the 5-mill levy for a system of market roads. Franklin, Licking and Muskingum counties have arranged for the paving of the National road and only that part extending through Guernsey county is not provided for.

No Railroad; Use Motors—A motor car bus service has been established between Richmond and Liberty, Ind., which has no railroad connection. The distance is 16 miles and several round trips will be made each day. Both passengers and light freight are carried. Similar service is to be established soon between Liberty and Brookville. The Liberty-Richmond line is known as "The Liberty Flyer."

Louisville in Anti-Noise Crusade—Official and determined action against the various and disturbing sounds caused by motor vehicles will be instituted by the Louisville Automobile Club within a few days. The organization has already called its executive committee's attention to the alarming prevalence of unnecessary noise made by motor cars. Complaints of regular violations of the city ordinance against the use of the muffler cutout on both motor cars and motor cycles have recently been brought before the club and action toward eliminating these nuisances will be taken at the next meeting of the executive body.

Trophy for Stock Car Race—The donation of a trophy by Bert Bowes of Winnipeg, has added considerable interest to the Winnipeg Automobile Club's annual race meet, which will take place on September 1. This trophy is offered for a 100-mile stock car race, all cars to be in road order with the exception of top, lamps and windshield. The race will be the curtain-raiser for the usual events which are put on the program each year by the motor club and which include the Dunlop trophy race, the 1-mile time trials for the Gas Power Age trophy, and the stock car events for the Goodrich trophy.

Motor Parade for Perry Fete—A prize parade of motor cars will be the feature of the third day's celebration of the Perry centennial at Milwaukee, and the Perry centennial committee has asked all motor car owners in the city to compete for the four large silver trophies donated for the purpose by business men. Owners are asked to conceive red, white and blue color schemes in decorating their cars. Officials of the Milwaukee Automobile Club will act as judges and the club will present a formidable delegation of decorated cars in the parade. The celebration will last 5 days, during which time the rehabilitated brig on which Commodore Oliver Hazard Perry upheld the supremacy of the United States on the Great Lakes will come into Milwaukee harbor.

Female Drivers for Taxicabs—"Taxi! Taxi! to the leading hotels." This cry, shouted by feminine voices, is heard in Joliet, the only Illinois city to boast of a taxi service operated by women. A woman has inaugurated an exclusive taxicab service for women and the experiment has attracted much attention around the state.

Quakers Plan Truck Parade—Co-operating with the Philadelphia Automobile Trade Association, the Philadelphia Inquirer will conduct the third annual commercial vehicle parade through the business section of Philadelphia July 31. Inaugurated 2 years ago, the parade was an instant success. The first year about 300 trucks were in line and in 1912 the number had increased to 509.

To Exhibit Farm Appliances—Cleveland's mid-summer motor show to be held in connection with the Forest City fair in August, will appeal particularly to farmers, as arrangements are being made by the show promoters to provide especially large accommodations for demonstrators with machines adaptable to farm uses. As roads will be in much better condition than in winter, when Cleveland's annual motor show is held, it is expected farmers will attend the mid-summer exhibition in large numbers.

Runs Free Motor Bus Line—An innovation in progressive department store management has been started by the Elliott-Taylor-Woolfenden Co., of Detroit, which has established a free motor bus line from the Campus Martius, the main traffic center of the city, to the store, half a mile distant, for the benefit of its patrons. Round trips are made on a 15-minute schedule during shopping hours. The vehicle consists of a Packard 2-ton truck chassis equipped with a special bus body.

Milwaukee Plans Truck Pageant—The Milwaukee Automobile Club is making plans for a mammoth commercial vehicle demonstration and parade on Labor Day, September 1, which will be the first event of this kind ever arranged in Milwaukee. Oscar Stegeman, president of the Stegeman Motor Car Co., has been appointed chairman of the special committee of truck builders and large truck owners to have charge of the demonstration. The main idea is to show the people of Milwaukee in concrete form the vast number of motor-propelled freight carriers used in the city and the wide application to businesses of all kinds.

Pike's Peak Region Popular—The Pike's Peak region has been the mecca of a larger number of motorists this summer than ever before. It is estimated that over 500 outside machines came to Colorado Springs during the month of June, and nearly half the number took out permits to remain some time. Since then the cars have formed a caravan across the plains, almost as continuous and unbroken as that marvelous train of white wagons which went drilling over the same course in the spring of 1860, following the gold slogan of "Pike's Peak or Bust." The Shan Kive, a great festival, with bands of Indians as the principal feature, is to be held on September 2 to 4, this year. A thousand machines carried more than five times that number of people to the Garden of the Gods one day last fall during the Shan Kive to see the Utes dance

Recent Club Activities

THE Automobile Club of Minneapolis has offered $25 reward for the arrest and conviction of persons throwing glass on the highways. The state law is against the practice.

During the past week 305 new members have been taken into the Automobile Club of St. Louis. The membership roll is expected to bear 5,000 names by September 1.

The Milan Automobile Club of Milan, Mich., has perfected organization with officers as follows: President, A. J. Anderson; secretary, Gil Kanten; treasurer, A. O. Christenson.

At the request of the motor clubs, several Alabama cities have passed ordinances making it unlawful to place in the streets any article that will be injurious to motor car tires. A fine of $25 to $100 is provided.

The Massachusetts State Automobile Association has opened an information bureau and offices at 93 Massachusetts avenue, Boston for the convenience of members who are in the Hub seeking information on motor laws and touring.

The Milwaukee Automobile Club will hold its seventh annual orphans' outing during the latter part of August and expects to entertain more than 500 homeless and parentless waifs of the city with a long ride, followed by a picnic luncheon at Washington park.

Members of the Hoosier Motor Club at Indianapolis have just found another advantage in being members of the club. They have been notified they can send telegrams collect through the Postal Telegraph Cable Co. in any part of the United States, by showing their membership cards in the Hoosier Motor Club.

Arthur C. Brenckle, former secretary and during 1912 first vice-president of the Milwaukee Automobile Club, has been elected treasurer. William H. Raymond, who was treasurer, resigned to become first vice-president at the time of the shake-up several weeks ago, when the president and first vice-president resigned.

Smarting under the criticism from the Sheboygan Automobile Club in regard to the condition of streets and roads in the city, the street commissioner of Sheboygan, Wis., has issued a demand that exact and specific reports be made, and he suggests that the club employ an inspector for this purpose. He promises that if this is done he will cheerfully co-operate.

The St. Paul Automobile Club has definitely decided to buy 33 acres of land at White Bear lake and erect a $50,000 house for year round use. The Anchorage, on Lake St. Croix, formerly used, will be sold. The new club will be two stories, with roof garden and basement, ballroom, cafe, cardrooms and private dining rooms. Second floor rooms will be for dormitory purposes. The basement will have a bowling alley and rathskeller. The clubhouse will face two lakes. A baseball diamond and tennis courts will be laid out.

The Kenosha Automobile Club, Kenosha, Wis., has set aside a fund of $2,000 to be awarded as prizes for road work during the coming year. Last year $2,000 was set aside for the same purpose and as a result there was considerably more permanent highway improvement accomplished than might otherwise have been the case. The K. A. C. plan is to donate $1,200 to the township which votes the largest amount of money for road work, and $800 to the town which comes next in amount. The only provision is that the road for which the townships appropriate money must be one of the highways radiating from Kenosha.

amid the historic rocks. Oklahoma visitors have taken first prize 2 years in succession for the largest number of outside machines in the Shan Kive parades.

Ohio Using Roads Organizers—The Ohio Good Roads Federation is sending organizers into every community in the Buckeye state for the purpose of perfecting the organization to boost the cause of good roads. It is planned to make the Ohio organization one of the most perfect in the United States. Local organizations are being formed in every village and hamlet in the state for the purpose of giving encouragement to the market road movement and it is hoped that within a short time Ohio roads will show the results of the movement.

Call for Help on Roads—In addition to setting aside 2 days next month for the working of roads by citizens throughout Missouri, Governor Elliot W. Major has announced that he would call upon the various county courts of the state to advise road overseers as to the preparations for handling the thousands of volunteer workers he expects to answer his call. The executive said he expected at least 500,000 persons will respond for the work. He aims to get out himself and do some work with a pick and shovel and would like to see every state and county official do the same.

GOVERNORS WHO MOTOR—LISTER OF WASHINGTON



TUCKED away in the far northwest corner of the United States is the commonwealth of Washington, a strong and progressive member of Mother Columbia's family. Washington is noted for many things—growing cities, fertile orchard land and rich mineral resources—but takes especial pride in its good roads activities. In the campaign for better highways, the motorists of the state have a staunch ally in Governor Ernest Lister, who believes that improved road conditions will increase the fame and riches of the commonwealth over which he rules. Like many other state executives, Governor Lister finds time to take short tours in a motor car, and after a short drive returns to his desk at the capitol building refreshed and ready to break all speed records for transacting official business for the state.

Good Roads Brevities

THE Bellefontaine Automobile Club of Bellefontaine, O., held an outing at Indian lake, June 18, which was a success in every way. The club recently secured a large number of new members.

The Niagara Falls-Buffalo boulevard was opened on Sunday, June, 22 for traffic. For some weeks past the Buffalo motorists have been making detours to the Falls as much delay was experienced in the completion of tne new road.

The Norwood Automobile Club of Norwood, O., gave a parade recently in which 150 cars participated. Prizes were given for the best decorations. The object of the parade was to secure votes for a bond issue for street improvements.

The Buffalo Automobile Club is laying plans to add about 500 names to its membership roll by conducting a general campaign which is to begin immediately a committee of fifty men having been appointed this week for that purpose.

An organization of motor car owners has been formed in Camp county, Texas. The new club is known as the Camp County Automobile Association. S. R. Greer is president; W. L. Garrett, vice president and W. J. Debenport, secretary and treasurer.

An organized effort is being made in Lauderdale, Colbert, Franklin, Marion, Fayette and Tuscaloosa counties, in Alabama, to get a state appropriation for a model highway to run from Florence on the north to Tuscaloosa on the south. This would be connected with the trunk line already built between Montgomery and Mobile.

The directors of the Automobile Club of Syracuse are sending letters to members asking their opinion in regard to arranging with the South Bay Clubhouse Association by which the Syracuse Automobile Club shall have the use of the clubhouse at South Bay. It will be possible to offer the privilege for merely nominal dues and it is expected that the arrangement will be carried out.

Negotiations have been completed by the county commissioners of Franklin, Licking and Muskingum county, Ohio, for the improvement of the old National highway from Columbus to Zanesville at a cost of $360,000. The federal government will bear $120,000 of the expense while the counties and state of Ohio will pay the remainder. Muskingum county which has 10½ miles will give $100,000; Licking county which has 30 miles will give $140,000. Franklin county's portion of the road is already well improved.
the road is already well improved.

All federal highways in Guatemala are to be made 4 feet wider in the future, acocrding to an order just issued by the Minister of Public Works. Bridges will be made 2 feet wider than present regular specifications. This order is due to the increasing use of motor cars and the certainty of their general use throughout the country before many years. Owing to the mountainous nature of most of Guatemalan territory the roads have been made narrow to reduce costs. There are long stretches where two cars cannot pass.

The motor clubs of Syracuse, Utica and Oneida have joined forces to prevent a repetition of the tragedy at Adams Crossing, between Oneida and Vernon, in which a Syracuse man and woman were killed May 4. The spot is ½ mile east of Oneida Castle and the road turns sharply upon a high bridge off which the ill-fated car drove to railroads tracks below. The three clubs have placed four illuminated signs warning motorists of this danger. Electricity for the signs will be furnished free by the Oneida Railway Co.



Among the Makers and Dealers



PREMIER Increases Capital—The Premier Motor Mfg. Cot. of Indianapolis has increased its capital to $250,000.

New Tire for Electrics—A new electric tire, called the Goodyear power saver pneumatic tire, is to be the Goodyear Tire and Rubber Co.'s contribution to the electric vehicle industry in 1914.

Larger Factory for Moline—Owing to the increase in business the Moline Automobile Co. is building an addition to the motor machine department. The new building, a one-story structure, will give 6,400 feet of added floor space.

Exports 737 Motor Trucks—The Chase Motor Truck Co., of Syracuse, N. Y., has exported 737 commercial vehicles within the past 10 months and officials are confident that the demand for American commercial wagons in foreign countries will increase rapidly within the next few years.

Allen Gets Fostoria Plant—A deed was filed recently conveying from the Peabody Buggy Co. to the Allen Motor Co., of Fostoria, O., the plant of the former which will be used to make the new Allen cars. The consideration as stated is the deed was $150,000 of the capital stock of the new corporation.

Ohio Falls Plant Sold—The plant of the Ohio Falls Motor Co., at New Albany, Ind., has been sold by the receiver to O. E. South, treasurer of the company. The consideration was $45,000. Mr. South expects immediately to organize a new company, which will have an authorized capitalization of $200,000 and manufacture a medium-priced runabout.

Maxwell to Increase Force—Steps have been taken to increase the working force at the plant of the Maxwell Motor Co., at Dayton, Ohio. Manager R. E. Baus announces that next year the plant will employ 3,000 men and the output of the factory increased to 10,000 cars. The plant is now turining out about thirty cars a day and is trying to make up for time lost during the flood.

Stutz Invents Self-Starter—The Stutz Motor Car Co., of Indianapolis, will equip its new series of cars with an electric self-starter. This is a starter designed by Harry Stutz, of the company, and is operated by a pedal, which throws on the current, simultaneously meshing the gears. It is said that the motor may be turned at the rate of 120 revolutions a minute with the starter.

Motsinger Tests New Device—Homer Motsinger, president of the Motsinger Devices Co., Lafayette, Ind., recently made a carbureter efficiency and economy test of considerable interest. He removed the gasoline tank from a Ford car, replacing it with a 1-gallon container of gasoline, and with this amount of fuel drove 32.6 miles, using a Motsinger device. He believes this establishes a new record and expects to make a further attempt to drive 35 miles with an equal amount of fuel.

Exhibition Building for Portland—Before another motor season rolls around it is probable that Portland, Me., will have a motor structure that will take care of exhibitions by the motor dealers. In the past there has been some trouble about motor shows, but now the dealers have formed a strong organization, talk of a new building has taken added impetus. Plans have been drawn by architects and submitted to the association calling for a building about 318 feet long and between 100 and 200 feet wide. The lower floor is to be divided into salesrooms for the members of the organization and the basement will have garage and repair facilities. The upper floor will give more than 20,000 square feet, and this is to be used for exhibition purposes.

Hartford Foundry Is Closed—The plant of the Hartford Foundry Co. of Hartford, Conn., which went into a receiver's hand recently, has been closed until the affairs of the company can be so arranged as to warrant the resumption of operations.

Willemin With Hupp Company—A. B. Willemin has been appointed director of purchases by the Hupp Motor Car Co. to succeed Charles H. Brennan who resigned to open an office in Detroit as expert appraiser and estimator of motor car properties.

To Make New Differential—William F. Muehl and L. H. Scurlock of Kansas City, Mo., have formed a company, incorporated under the laws of the state of South Dakota for $1,000,000, for the purpose of manufacturing and marketing a differential which is claimed to drive both rear wheels of a car regardless of whether one wheel is in mud and the other on dry road. The factory for the manufacture of this differential has not yet been decided upon, but it is said that Waterloo, Ia., will be the location.

Overland Shops to Open July 21—The 6,000 employes of the Willys-Overland and Kinsey Mfg. Co. will go back to work after a brief shutdown on July 21. The many improvements, including new additions and the brick testing track are well under way.

Federal Steel Stock Increased—The Federal Pressed Steel Co., of Milwaukee, which is completing a large plant at Keefe avenue and North Pierce street, has increased its capital stock from $50,000 to $150,000 in preparation for the commencement of operations. The company will be an active factor in the motor car parts industry.

Cleveland Gets Cyclecar Plant—The Downing-Detroit Motor Car Co. has completed negotiations for a factory site in Cleveland where it will manufacture cyclecars. The Downing-Detroit model for 1914 is a 12-horsepower machine of roadster type, carries two passengers and weighs 800 pounds. The company expects to build 30,000 cyclecars during the ensuing year.

Making Motor Car Bodies—The Commercial Auto Body and Mfg. Co., of Cleveland, incorporated in June with a capital of $50,000, has just finished equipping its plant at 5345 St. Clair avenue. Truck and other specially designed bodies are an important part of the company's work, although painting, top and upholstering, blacksmithing and motor repair departments are maintained.

Klumb Company Enlarging Plant—The Klumb Engine and Machine Co., of Sheboygan, Wis., is erecting three new buildings, a machine shop, pattern works and power house, which will form the nucleus of its large gas engine and parts plant. The company was organized several months ago by Paul Klumb, for many years secretary of the Globe Foundry & Machine Co., and his three sons.

Packard Sales Break Records—Shipments of Packard vehicles during the last 3 months make the largest total for a fiscal quarter ever reached by the concern. In the period mentioned motor cars and trucks representing a value of $8,120,000 were delivered to purchasers. The shipments in May were the largest for any one month since the Packard company started in business. April of this year was the highest month up to that time.

Danville After Cyclecar Plant—The Economycar Co., of Indianapolis, is negotiating with several cities with a view to locating its plant elsewhere than Indianapolis. It is said that an attractive offer has been made by Danville, Ill., and the company may decide to locate there. The company, which was organized recently to manufacture cyclecars, is anxious to begin operations, and hopes to be placing cars on the market within the next 30 days.

Cameron Moves from Beverly—Beverly, Mass., has not only lost the summer capital, but the plant of the Cameron Motor Car Co. as well, the Cameron makers recently deciding to move to West Haven, Conn., where active operations will be started August 1. The Cameron company has purchased the factory formerly occupied by the Mathusek Piano Co. and will raise its capital stock to $250,000, $50,000 of which has been subscribed by West Haven investors. The plant will employ 250 men and the company will turn out a four-cylinder, 30-horsepower car,

Coming Motor Events

CONTESTS.

July 1—Indianapolis to Pacific coast tour; promoted by Indiana Automobile Manufacturers' Association.
July 1-16—Motor plow competition, Winnipeg, Can.
July 1-August 12—French army drills.
July 12—Lincoln, Neb., track meet.
July 12—French grand prix.
July 12-13—Track meet, Seattle, Wash.
July 11-19—A. A. A. endurance run, Minneapolis to Glacier Park, Mont.
July 17—St. Joe, Mo., track meet.
July 18-19—Track meet, Peoria, Ill.
July 20—Tulsa, Ariz., track meet.
*July 21-25—Reliability tour, Grand Rapids, Mich.
*July 26-31—San Antonio, Tex., tour.
July 26—Orangeburg, N. Y., track meet.
*July 28-30—Galveston, Tex., beach race.
August 4—Grand Prix road race at Le Mans, France.
August 9—Road races at Santa Monica, Cal.
August 12—Kansas State Automobile Association endurance run to Colorado Springs.
August 18-20—Fourth annual Wisconsin reliability tour.
*August 29-30—Elgin road races, Chicago Automobile Club.
August 30—September 6—Reliability run, Chicago Motor Club.
September 9—Corona beach race, Cal.
September 1—Track race, Columbus, O.
September 8-15—Around Lake Michigan tour; Chicago Motor Club.
September 12—Track meet, Canfield, O.
September 13—Track race, Grand Rapids, Mich.
*September 13—Track meet, Covington, Ky.
September 20-21—Track meet, Detroit, Mich.
September 21—French light-car road race, Boulogne.
September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
November 6—Track meet, Phoenix, Ariz.
*November 24—Vanderbilt road race at Savannah, Ga.
†November 27—Savannah grand prix.
*Sanctioned by A. A. A.
†Sanctioned by A. C. A.

Shows

October 17-27—Paris show.
November 7-15—Olympia show.
January 24—Chicago show.
January 31-February 7—Minneapolis show.

equipped with self-starter for the 1914 trade. It is planned to build 1,000 machines for the coming season.

Insist on Full Measure—The sealer of weights and measures at Washington, D. C., is about to inaugurate a crusade against garages and oil dealers who sell under measure quantities to motorsits. Warrants have been issued for the arrest of several garage men who are alleged to have given short measure and the men in question will be prosecuted in the police court.

Watertown After Iron Foundry—The project of establishing a large malleable iron foundy at Watertown, Wis., has been revived after lying dormant for 8 months. It is the intention to form a $100,000 corporation and establish a foundry producing about 2,500 tons per annum. A public meeting is scheduled for July 18 to discuss the proposition. E. J. Vanderboom, E. Ward and H. Kreitner, of Milwaukee, are assisting in the promotion of the enterprise.

Sheboygan Company Changes Name—The American Gas Engineering Co., Sheboygan, Wis., organized early this year with $50,000 capital to manufacture gasoline engines and machinery, has changed its name to Universal Oxygen Co. and will devote most of its attention to the cutting and welding business by the oxy-acetylene process. A plant is being erected at South Fourteenth street and the Sheboygan river, which will include an extensive department for the care of motor car business.

Recent Incorporations

Antigo, Wis.—Holland Flexible Auto Wheel Co., capital stock, $10,000; to manufacture wheels; incorporators, J. E. McKenna, J. Donahue, T. Holland.

Boston, Mass.—Paige Motor Car Co., capital stock, $1,000; incorporators, T. Gawne, R. B. Nettleton, P. R. Ammidon.

Bowling Green, O.—Modern Motor Car Co., capital stock, $1,000; incorporators, W. P. Abbey, T. E. Moore.

Bremen, O.—Bremen Garage Co., capital stock, $10,000; incorporators, M. L. Campfield, E. A. Hufford.

Buffalo, N. Y.—Buffalo Auto Accessory Mfg. Co., capital stock, $20,000; incorporators, J. B. McCready, J. T. Miller, E. S. McCready.

Chicago—Divine Motor Car Co., capital stock, $10,000; to manufacture motor vehicles; incorporators, E. C. Divine, H. E. Campbell, W. R. Mitchell.

Cleveland, O.—Weber-Pelz Transfer Co., capital stock, $5,000; general trucking business; incorporators, W. A. Weber, J. W. Pelz, W. F. Kees, E. A. Lehman, A. O. Weber.

Cincinnati, O.—Nyberg Auto Sales Co., capital stock, $25,000; incorporators, E. Hine, C. H. Smith.

Columbus, O.—Columbus Electric Vehicle Co., capital stock, $50,000; incorporators, O. H. Perry, D. N. Perry, W. G. Neff.

Detroit, Mich.—Auto Sand Grip Co., capital stock, $40,000; to manufacture parts and accessories; incorporators, G. Sanderson, K. V. Shotwell, J. B. Williams.

Detroit, Mich.—Overland Detroit Co., capital stock, $10,000.

Great Neck, N. Y.—Charles W. Smith Taxicab Co., capital stock, $2,000; incorporators, C. W. Smith, E. C. Smith, J. G. Ketcham.

Haddonfield, N. J.—Tire Place Incorp., capital stock, $100,000; to manufacture and deal in motor cars; incorporators, J. G. Hughes, H. Fischer, H. W. Davis.

Houston, Tex.—Green Taxicab and Automobile Co., capital stock, $15,000; incorporators, F. W. Crow, E. M. Wiess, W. W. Kyle.

Hot Springs, Ark.—Garland Auto Co., capital stock, $10,000; incorporators, C. Williams, G. C. Irvine, L. D. Cooper and others.

Louisville, Ky.—Cadiz Auto Co., general livery and garage business; incorporators, J. S. Crenshaw, W. H. Hammond, G. P. Thomas, O. H. Malone, V. B. Alexander.

Milwaukee, Wis.—Porto Metal Hose & Garage Co., capital stock, $5,000; to build portable structures; incorporators, J. E. Tracy, L. P. Weber, P. G. Weber.

New York, N. Y.—Ardsley Garage Co., capital stock, $60,000; incorporators, S. Meyer, M. A. Cramer, J. Fischer.

New York, N. Y.—Taxomobile Co., capital stock, $1,000; incorporators, A. Snydecker, A. G. Ibbeken, L. F. Ibbeken.

New York, N. Y.—Packard Auto Exchange Co., capital stock, $1,000; incorporators, B. Elstenstein, J. J. Burgess, J. S. Farran.

New York, N. Y.—Crown City Auto Co., capital stock, $10,000; incorporators, L. Oldsfield, H. D. Gorby, W. L. Keuhn.

Newark Del.—International Metal Wheel & Supply Co., capital stock, $100,000; to manufacture wheels and supplies for motor cars; incorporators, W. H. Dean, W. H. Cooper, Jr., E. C. Jackson.

Philadelphia, Pa.—Bigelow Willey Motor Co., capital stock, $50,000; incorporators, J. Bigelow, G. A. Willey, E. C. Benson.

Racine, Wis.—Racine Drop Forge Co., capital stock, $20,000; to manufacture forgings and parts.

Toledo, O.—W. I. Auto Top Lift Co., capital stock, $10,000; incorporators, H. W. Fraser, G. M. Reswick.

Waukesha, Wis.—Bartles-Shepard Oil Co., capital stock, $40,000; wholesale and jobbing business in lubricants and motor fuels; incorporators, A. G. Maguire, A. U. Stetten, J. H. Marshultz.

Wheeling, W. Va.—Union Automobile Co., capital stock, $25,000; incorporators, A. C. Shaffer, A. W. Schenk, G. P. Palman and others.

The Motorists' Bookman

WITH E. H. Blichfeldt, the author of "A Mexican Journey," as a guide, a rambling journey through our romantic sister republic and back into the blood-stained sixteenth century is a delightful experience, and a perusal of this entertaining book probably will prompt the motorist to contemplate seriously a tour through the land of Montezuma.

Knowing Mexican conditions well and consequently having faith in the republic of unrest, Mr. Blichfeldt writes entertainingly and learnedly of a nation pregnant with romance and rich in scenery. He takes the reader to hoary landmarks—Aztec temples and Spanish missions—and discusses informally and interestingly Mexico's people, history, cities, industry and social life.

After the 270 pages, one is convinced that the author has kept a promise made in the first chapter—"If you will join our company going to Mexico, I promise to show you things enjoyable to see." "A Mexican Journey" is illustrated from photographs and from the press of the Thomas Y. Cromwell Co., New York.

Arizona—The Motorist's Wonder Realm

Looking through the Arizona Road Maps and Tour Book, one has the feeling of viewing a thumb-nail sketch of infinity. Considering the amount that may be told of the wonders of that section of the country and the small space in which it is presented, the compilers have succeeded admirably in giving an idea of the marvelous and limitless attractions of the state and the routes by which they may be reached. Historic, scenic and commercial points of interest are brought out in the text, and the numberless illustrations are well reproduced, while the exquisite color-picture of the Grand canyon, which appears on the cover, is worthy of a frame. Strip maps, worked out on a plan similar to those of the Trail to Sunset by the A. A. A., are full in their information and clear in their print, but unfortunately are not all drawn to the same scale. The many advertisements are illustrative and appertain to the interests of the motorist. It is the first tour book of the state, and without doubt succeeding numbers will enlarge upon the field, which is worthy of so much more extended representation. Published by the Arizona Good Roads Association, Prescott, Ariz. Price $2.

The Metallography of Iron and Steel

Arthur Sauveur in his recently published book on the metallography of iron and steel has accomplished an exceedingly fine piece of work, especially for the student of metals. In the opening chapter, which deals with the apparatus necessary for a metallographic laboratory, the author seems to be in touch with the inherent demands of the average student. Many motorists too, who ramble deeply into the construction of the motor car, often are desirous of installing apparatus for the purpose of conducting research work which will enable them to offer suggestions to car manufacturers.

Besides being well illustrated with different surface appearances of iron and steel of various grades, the definitions and methods of forming of the different kinds of steels are interpreted well. Separate chapters are devoted to annealing, hardening and tempering and they are as interesting as they are instructive. As a whole the book will find favor not only among students and motorists, but a large percentage of engineers will find interesting matter. It is from the press of Sauveur & Boylston, Cambridge, Mass.

British Motor Vehicles

The 1913 edition, pleasure car section, of British Motor Vehicles, compiled by J. D. Critchley, M. I. Mech. E., M. I. A. E., is a most valuable brochure and contains not only a list of British makers, classification of cars in order of chassis price and car specifications but additional chapters on such interesting subjects as Brookland records, British trade statistics, considerations in purchasing a car, second-hand cars, notes on the cost of running a car, motor car insurance, rules of registration, charges for conveyance and transport, foreign customs duties, a speed formula and several speed and measurement tables. The book is published by Charles D. Clayton, Ltd., and costs 1 shilling.

Elements of Machine Design

W. Cawthorne Unwin, working in conjunction with A. L. Mellanby, has had published the second part of a series of books bearing the title, "The Elements of Machine Design." The second edition deals primarily with steam engines and the authors have aimed to include in the volume sufficient material to make it a book of reference for draughtsmen and one of study for the engineering scholar. Problems in machine design are set forth and it is the intention of the authors to have these problems worked out by the student with a view to guiding him in his work. It is from the press of Longmans, Green & Co., New York.



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Minot, N. D.	C. C. Nugent	Franklin
St. Thomas, N. D.	Motor Inn	Franklin
Wilkesbarre, Pa.	W. S. Lee	Franklin
Boston, Mass.	William Sanford	Marathon
Somerville, Mass.	Armstrong & Curtis	Marathon
Atlanta, Ga.	George W. Hanson	Oakland
Cleveland, O.	Detroiter Sales Co	Detroiter
Oklahoma City, Okla.	W. R. Light	Franklin
Prince Albert, Sask.	Modern Automobile Co.	Franklin
Canton, O.	Belden Brothers	Franklin
Freeport, Ill.	C. M. Saxby	Franklin
Columbus, O.	Standard Motor Car Co	Hudson
Columbus, O.	Oscar Lear Motor Car Co	Buick
Columbus, O.	Everitt Automobile Co	Maxwell
Columbus, O.	Joseph Metzger	Pilot
Columbus, O.	Empire Automobile Co	Empire
Columbus, O.	Frank P. Corbett	Marion
Sioux City, Ia.	Cutting Motor Car Co	McFarlan
Montreal, Can.	Henri Rodier	McFarlan
Minneapolis, Minn.	Stimson Automobile Co	Wahl
Milwaukee, Wis.	Hoppe-Hatter Motor Co	Chalmers
Milwaukee, Wis.	Baker Electric Agency	Baker
Milwaukee, Wis.	Hustis Brothers	Stevens-Duryea
Milwaukee, Wis.	Hustis Brothers	Borland
Vancouver, B. C.	Davie Vulcanizing Co.	Inter-State
Birmingham, Ala.	Robertson Tire & Auto Co.	Herreshoff

COLUMBUS, Ohio—Harry E. Smith, 43 West Broad street, has taken the central Ohio agency for Empire tires.

Boston, Mass.—Fred A. Law, until recently superintendent of the Selden Motor Vehicle Co. at Rochester, N. Y., will conduct a general supply agency with headquarters in Boston.

Green Bay, Wis.—The Washington Street Garage, a partnership between L. P. Larson and F. L. Fosha, is now owned solely by Mr. Larson, the partnership having been dissolved and Mr. Fosha retiring.

New York—The H. W. Johns-Manville Co., manufacturer of electrical insulation and dry batteries, has recently opened a branch office at Charlotte, N. C. The new office in the Commercial Bank building is in charge of E. U. Heslop.

Boston, Mass.—L. R. Speare, ex-president of the A. A. A., who had a financial interest in the W. L. Russell Co., Boston agent for the Regal and Haynes cars, has sold out his interests to Mr. Russell, who is now conducting the agencies alone.

Detroit, Mich.—A. H. Wells & Co., of Waterbury, Conn., manufacturers of seamless brass and copper tubing, have recently opened offices in Detroit at 1311 Dime Savings Bank building, with Charles C. Limbocker as its representative.

Chicago—The Nemo Chemical and Paint Mfg. Co., has taken possession of a new factory in Chicago, at Wright and Rawson streets, with general offices in the Rector building. Their accounting sales will be handled through Paul G. Niehoff & Co.

Milwaukee, Wis.—The Gas Tank Recharging Co. of Milwaukee has established offices and service station at 256 Fifth street and will make a bid for acetylene gas tank business. John J. McJesky is president and Fred J. Pagels is secretary and treasurer. The corporation is capitalized at $25,000.

Philadelphia, Pa.—The General Motor Co., local distributor of the Lozier, has been superseded by J. W. Bigelow and Guy Willey, under the firm name of the Bigelow-Willey Motor Co. The latter concern has taken over the General Motor Co.'s new establishment at Twenty-first and Market streets and in addition to the Lozier will handle the Federal and Standard trucks.

Indianapolis, Ind.—The retail business of the Indianapolis branch of the Studebaker Corp. has been taken over by the Brown-Rowan-Buck Auto Sales Co., a $40,000 concern formed by Detroit men. There is to be no change in the wholesale distributing business of the branch, which will still be under the management of R. L. Sutherland. The change in the retail end of the business will give Mr. Sutherland an opportunity to devote his attention exclusively to building up the Studebaker sales organization in Indiana and adjacent states.

St. Paul, Minn.—George Michael, formerly a wholesale city salesman, has bought the storage business of the new Osborn garage and will extend the clientele.

Columbus, Ohio—The garage and repair shop at 117 Parsons avenue, formely operated by Engle & Vincent, has been taken over by Cummins & Carpenter.

New Lexington, Ohio—Work is progressing rapidly on the erection of the garage and salesroom for Dillow and Sons. The place will be known as the Auto Inn.

Chicago—The Century Rubber Works, reclaimer of rubber and manufacturer of motor car accessories, has located its general offices in the Rector building under the direction of Paul G. Niehoff & Co.

Boston, Mass.—Joseph M. Everett, formerly with the Diamond and Walpole tire branches in Boston, has been appointed manager of the Boston branch of the Dayton Tire Co., to succeed E. C. Newcomb, who has been promoted.

Canal Dover, Ohio—J. A. Trew has sold the Wooster garage and agency for the Ford line to E. H. Zollar and Fred Potschner, both of Canal Dover. The business will be conducted in the future under the name of the Dover Automobile Co.

Indianapolis, Ind.—The appointment of Philip Ragan as manager of the Rauch & Lang Auto Co. of Indianapolis has been announced. Brandt Bros. of the same city, agents for the Lozier and Chandler, have taken the agency for Braender tires.

Boston, Mass.—F. H. Freeman, for some time identified with the Henley-Kimball Co., Hudson agents in Boston, and later with the Berkeley Motor Car Co., has resigned to take a position as sales manager of the New England branch of the Stutz Motor Car Co. in Boston.

Columbus, Ohio—The Standard Motor Car Co., which has temporary headquarters at 241 North Fourth street, has been organized to handle the Hudson in central Ohio territory. The company is composed of H. J. Swartz, B. M. Ellis and Harry Mason, all of whom were formerly connected with F. E. Avery.

Milwaukee, Wis.—Adolph C. Hoppe, until recently secretary and treasurer of the Smith-Hoppe Automobile Co., 215 Wisconsin street, state agent for the Chalmers, R-C-H and Detroit electric, has organized a new concern, the Hoppe-Hatter Motor Co., to handle the state agency for the Chalmers. Headquarters have been established in the new Mulkern garage, 604 Downer avenue, until the company can build a garage and salesroom of its own. C. P. Hatter, secretary and treasurer of the new concern, comes from the Chalmers works.

San Francisco, Cal.—A. W. Barber, for some years past with the Stevens-Duryea Motor Co., has been selected to manage the newly established coast plant at San Francisco.

Toledo, O.—H. M. McCord, who has acted as local agent for the Cadillac Motor Car Co., has resigned his position and disposed of his interests. He expects to identify himself with a Cadillac agency in another state.

Milwaukee, Wis.—The Baker Electric Co. of Cleveland has established a salesroom and service station at Milwaukee in the building at 137 Oneida street, formerly occupied by Hustis Bros., agents for the Stevens-Duryea and Borland electric.

Detroit, Mich.—F. W. Sutton, formerly in charge of outside production of the American La France Fire Engine Co., and the F. B. Stearns Co., of Cleveland, has taken a similar position at the Detroit plant of the Continental Motor Mfg. Co.

Aurora, Ill.—Although a city of over 30,000 inhabitants, Aurora has never had a tire store until recently when Wallace G. Randall opened such a service station at the corner of Water and Main streets where he carries a full stock of Shawmut tires.

Atlanta, Ga.—George W. Hanson, for years connected with the E-M-F and Studebaker companies, has contracted to handle the Oakland line for the entire south, as direct factory distributor. The local Oakland branch, through which the Oakland company has distributed for the entire south, will be abolished.

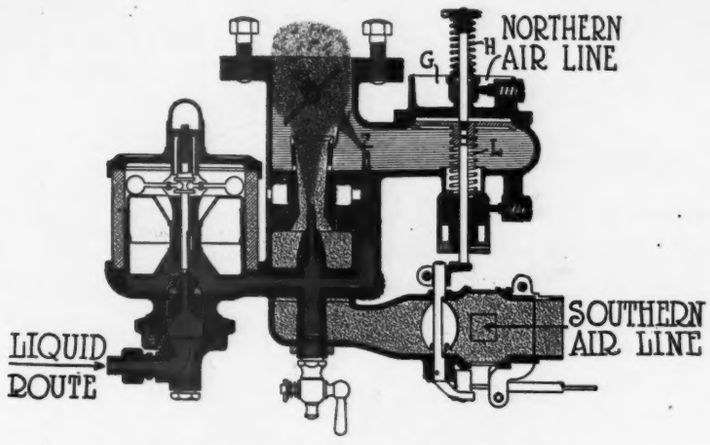
Boston, Mass.—P. C. Chrysler of New York, who has been manager of the New England branch of the Garford for the past year, has resigned and returned to the New York branch. His place in Boston has been taken by R. F. Ketchum, formerly manager of the General Motors branch and later with the International Motor Co.

Milwaukee, Wis.—The Wold Bros. Co. is the new name of the old established firm of Wold Bros., 678 National avenue, general repairs, painting and overhauling. The partnership has been made a corporation capitalized at $20,000, all of which is owned by Axel, George and John Wold. The firm was originally established 25 years ago.

San Francisco, Cal.—An announcement of importance to the motoring interests on the Pacific coast was made during the past week by L. H. Rose, Pacific coast manager for the Lozier Motor Co. The Detroit company has disposed of its San Francisco branch to the Bekins-Speers Motor Co. of Los Angeles. The San Francisco branch includes Northern California, Arizona and Nevada territory.

LITTLE JOURNEYS.

With a Drop of Gasoline through the New Type "G" STROMBERG CARBURETOR



Outline map of our Journey via the Northern Air L ine.

IN our Little Journey today, via the Northern Air Line, we find that auxiliary, or diluting air, enters at G. It is whisked along by motor suction—absorbing on its way the gas spraying from nozzle 2—till it strikes full tilt the outside walls of extended venturi V. Following the line of least resistance, it sweeps *around* this venturi—forms a miniature, yet very energetic cyclone—and *whirling*, whips up, and churns in every atom of gasoline with every atom of regular and auxiliary air.

Consequently, the "firing," or completely beaten up mixture, is all of one consistency when it is shot up into the manifold. A streak of raw air or raw gas is *mechanically impossible.* Motorists who understand this exclusive feature of STROMBERG construction, understand *why* the STROMBERG is the carburetor of POWER and ECONOMY.

Furthermore, it isn't necessary to wear an M. E. after your name to be able to adjust a STROMBERG. *The only adjustment is on the auxiliary air.* Anyone with intelligence enough to wind a watch can turn the trick.

Note that there are two springs governing the auxiliary air valve, L, the low speed spring, and H, the high speed spring. The adjustments on these two springs are *separate*—one never interferes with the other, *because your high speed spring (H) is never brought into play at low speed.*

This makes the STROMBERG New Model "G" practically two carburetors in one—a distinctly separate instrument for low speeds, and a distinctly separate instrument for high speeds.

Stromberg Motor Devices Company

54 East 25th Street **Chicago, Illinois**

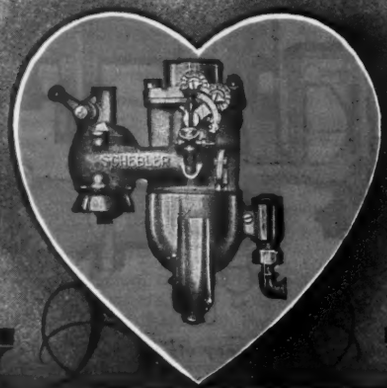
BRANCHES

New York **Boston** **Detroit** **Indianapolis** **Minneapolis**

Pacific Coast Distributors: Chandler and Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle.
Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver.

SCHEBLER

The Aristocrat of Carburetors



"The Heart of the Automobile"

WHEELER & SCHEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS
INDIANAPOLIS U·S·A·

THE SCHEBLER IS THE ACKNOWLEDGED STANDARD CARBURETOR OF THE WORLD

Branches

EW YORK
OSTON
HILADELPHIA
TLANTA
INNEAPOLIS
ANSAS CITY
HICAGO
DETROIT
DENVER
SAN FRANCISCO
LOS ANGELES
SEATTLE
MONTREAL CAN.
SIDNEY AUSTRALIA

Service Department Distributors

Every city and town in the United States and Canada · Europe and · · Australia · · ·

Connecticut Requires Powerful Warning Signal

A NEW warning signal law went into effect in the State of Connecticut on July 1, 1913: "Every motor vehicle so operated shall be provided with a suitable bell, horn, or other signaling device, which shall produce an abrupt sound sufficiently loud to serve as an adequate warning of danger, but no person operating any motor vehicle shall make or cause to be made any unnecessary noise with such bell, horn or signaling device, or use the same except as a warning of danger." . . . The note of the bulb-horn is not "sufficiently loud to serve as an adequate warning of danger." It can be heard only for a short distance under the best conditions. In city traffic, on curving country roads, in windy or rainy weather, it is seldom heard. It is useless in an emergency—it is not only awkward to operate but often fails entirely when submitted to sudden pressure.

SIMILAR measures directed against the bulb horn are in operation in several other states, and in 26 of the largest cities in the country.

THE KLAXON is used by 200,000 motorists. Carried on nine out of ten high-grade cars. Regular factory equipment on 57 different makes of automobiles.



KLAXONET

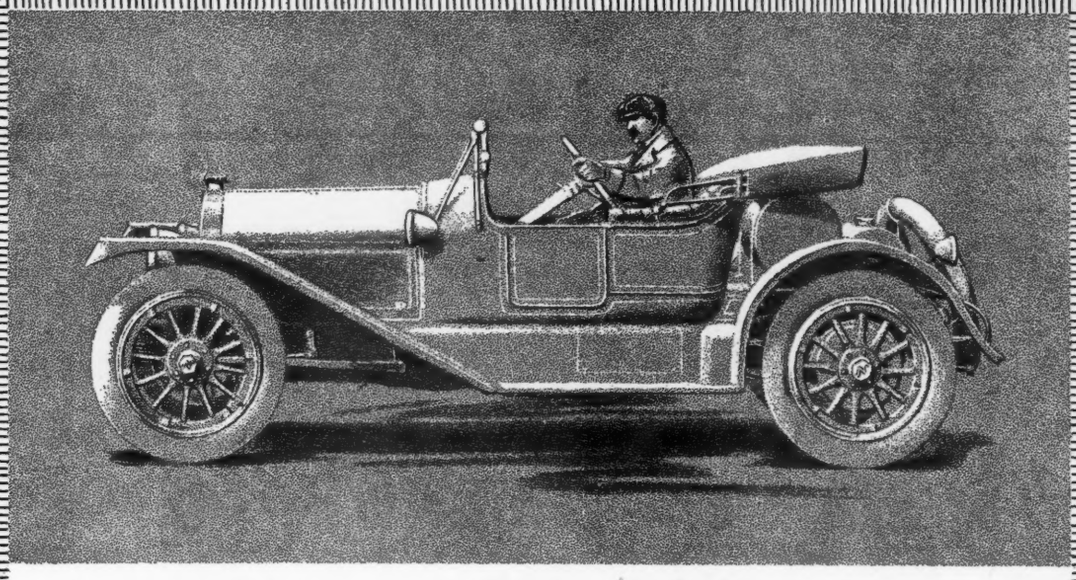
Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON



Speedway Roadster. One of five models $2750 to $3400

Help Yourself to the Road with your

National

The World's Champion Car

World's Stock Champion Car.
World's fastest mile with stock car, average 89.28 miles per hour.

Holds world's record for fastest 500 miles in competition. Actual running average of 81.72 miles per hour.

THERE is pride and satisfaction in owning the one car that has demonstrated its superiority over all others — both American and foreign-made. For Superb Power coupled with Unusual Ease of Control—and for Stately Appearance accompanied by Reliability and Ability in any Emergency, the National represents the very best in all the world.
Thirteen years of manufacturing experience and a company with unimpeachable reputation guarantees this car to you.

Get Any One of These Books, Free, by Writing Us Today

Story of the fastest 500 miles ever traveled. Won by National in 1912.	Story of the 500-mile race in 1913. Illustrated and valuable as a souvenir and reference book.	Story of the National cars; various models; descriptions; illustrations and specifications.	"How to Sell More Motor Cars"—an interesting book for dealers. Explains the National's liberal attitude toward owners.

New Series V-3: Immediate delivery

National Motor Vehicle Co., Indianapolis, Ind.



KNOCKERS!

Here's what you are going to see when buyers of 1913 old-style hand crankers begin to realize how they have been buncoed.

Every man wants to be up-to-date, but

CARS WITHOUT ELECTRIC SELF CRANKERS ARE BEHIND THE TIMES

Can you complacently watch your friends enjoy the push-the-button luxury of electric cranking and lighting while you continue twiddling a hand crank and fussing with inefficient, dirty oil or other lights?

Be up-to-date. Insist that **your** car shall be equipped with an Electric Cranking and Lighting System operated from an

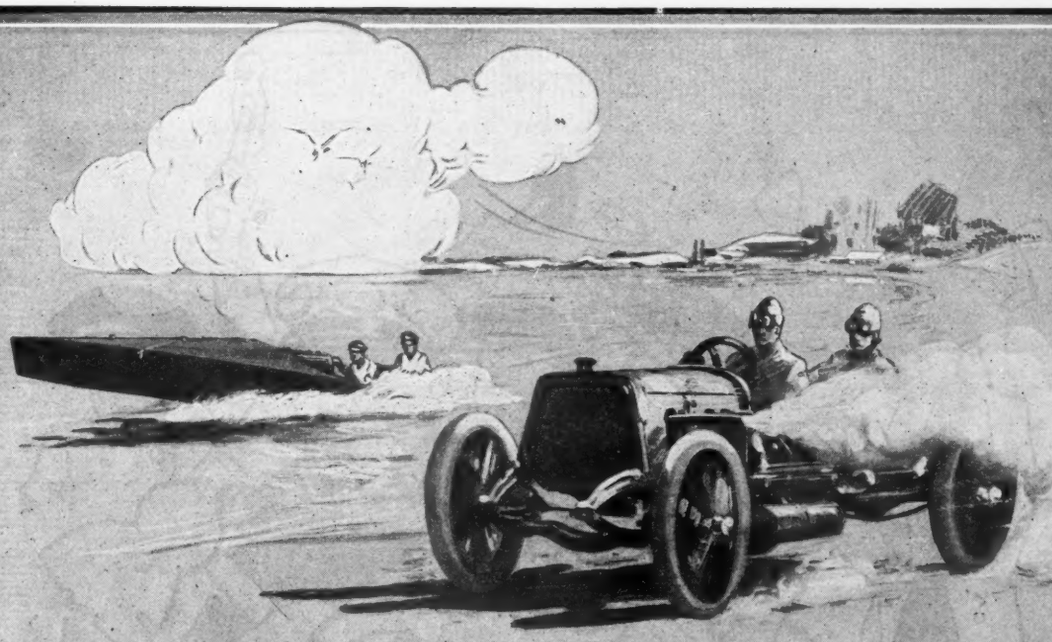
LBA **STORAGE BATTERY**

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

New York Branch: 136 W. 52nd St.
Detroit Branch: 1191 Woodward Ave.
Chicago Branch: 2241 Michigan Ave.
San Francisco Branch: 243 Monadnock Bldg.
Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Depots in all Principal Cities in the United States, Canada and Mexico

31



Polarine

FRICTION REDUCING MOTOR OIL

For Any Kind of Motor
In Any Kind of Car or Boat

An oil that's right is **right in every** type of motor, whether in a pleasure car, a motor truck or motor boat. The universal oil is Polarine—used everywhere, and sold at cross-roads stations. Users never need go far without it.

Maintains the correct lubricating body at any motor speed or heat, and flows perfectly at zero. Penetrates to the remotest parts of the motor, protecting every friction point.

Cars run for years without depreciation when Polarine is used. **It's the best insurance you can buy,** and costs the least.

The World's Oil Specialists make it after 50 years' experience with every kind of lubricating problem and a study of all makes of motors produced. **Polarine** is the right oil.

STANDARD OIL COMPANY

(AN INDIANA CORPORATION)

Makers of Special Lubricating Oils for Leading Engineering and Industrial Works of the World

(112)

HOLLEY CARBURETOR



No Moving Parts **Only One Adjustment**

The Entire Elimination

of all springs, delicate valves, balls, cams and other sensitive devices which are hard to adjust and which get out of order easily, make the new no-moving-parts Holley unquestionably the simplest and most efficient mixing device in use on automobiles today.

Tests made in competition with over 32 of the old-fashioned spring types show greater horsepower developed and a decided decrease in fuel consumption.

As a result, so great has been the demand for this new self-adjusting Holley that our entire 1913 output has been sold.

Over half the gasoline cars manufactured in 1913 are equipped with this new no-moving-parts Holley.

Over 215,000 finished carburetors will be shipped this year—more than the combined amount of gasoline automobile carburetors made by all other makers.

Our 1914 demonstration outfits now ready.

Let us have your specifications early.

TO AUTOMOBILE OWNERS!

If you have a car equipped with an old-fashioned spring valve carburetor which has been in use for several seasons, take it to your garage man and have him equip it with the new self-adjusting Holley.
The saving in gasoline alone will pay for it in a few months.

HOLLEY BROTHERS CO., 131-141 Rowena St., Detroit

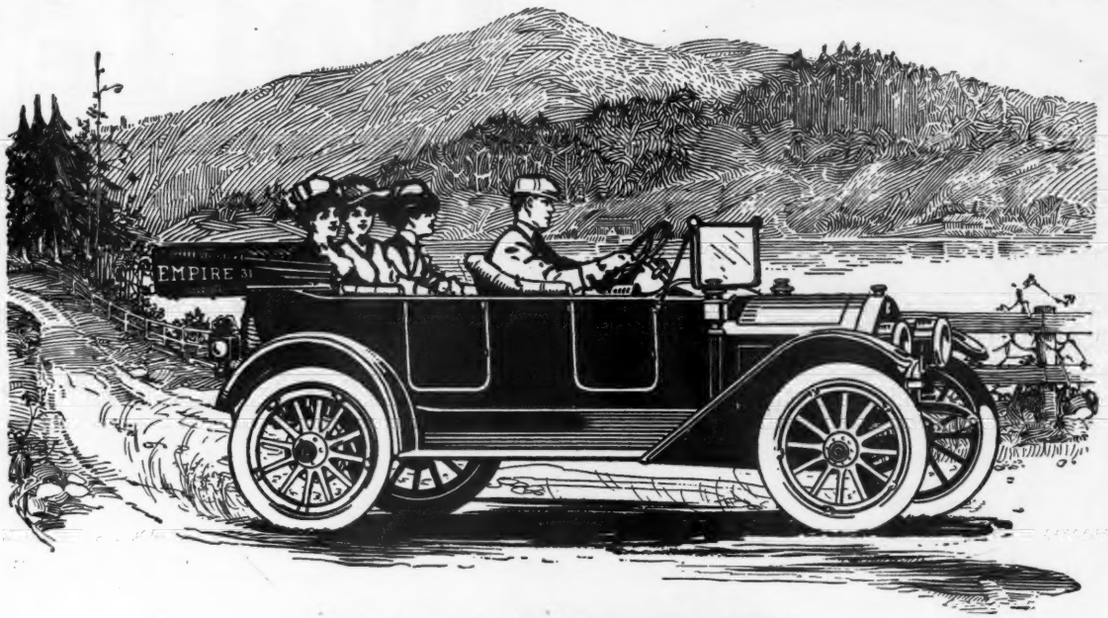
AUTOMOBILE SUPPLY COMPANY...1335 Michigan Boulevard, Chicago, Ill. **OMAHA RUBBER COMPANY**.....Omaha, Neb.
FOREIGN BRANCH: Holley Bros. Co., Coventry, England

Holley Carburetors are carried in stock at the following addresses: **CHAS. E. MILLER, Home Office:** 97-103 Reade St. and 121 Chambers St., **New York**

BRANCHES:

New York City.....924 Eighth Ave. Between 54th and 55th Sts.
New York City.....2782 Broadway Between 107th and 108th Sts.
Springfield, Mass.....Bridge and Dwight Sts.
Hartford, Conn.....274 Trumbull St.
Atlanta, Ga.....66 Edgewood Ave.
Brooklyn, N. Y.....1421 Bedford Ave.
Buffalo, N. Y.....824 Main St.
Albany, N. Y.....135 Central Ave.
Boston, Mass.....202-204 Columbus Ave.
Detroit, Mich.....227-229 Jefferson Ave.
Cleveland, Ohio.....1829 Euclid Ave.
Philadelphia, Pa.....318 North Broad St.
New Orleans, La.....601-603 Baronne St.
Newark, N. J.....274 Halsey St.

When Writing to Advertisers, Please Mention Motor Age.



EMPIRE

"The Little Aristocrat"

COMPLETELY EQUIPPED $950

Demountable Rims	Windshield	Prest-O-Lite Tank	Speedometer
Mohair Top	Robe and Foot Rails	Gas Head Lights	Oil Sight Feeds
Top Envelope	Oversize Tires	Oil Side and Tail Lamps	Rear Double Tire Irons
Enclosing Curtains	Tool and Tire Kits	Pump and Jack	Horn Under Hood
Shock Bumpers	Extra Rim	Dash Air Adjustment	Eisemann Magneto

It was the sturdy reliability and touring excellence of the Empire and its economy of up-keep and operation that brought the great flood of orders.

It is largely because of this that we are quadrupling our output for next season: and the increased production is under way right now.

We are prepared to allot territory which is now open. If you are in open territory, tell us who and what you are.

Empire Automobile Co., Indianapolis, U.S.A.

TRACTION TREAD NON-SKID TIRES

"Tires That Take Double The Wear With Half The Tear"

THE rubber composition from which these tires are moulded—a formula determined only after years of most searching experiment—has no superior for DURABILITY. TRACTION TREAD Casings, down to the last thin tissue, hang together with as great tenacity as if the rubber were **wired.** That is one reason TRACTION TREAD TIRES consistently give thousands of miles more service than their mileage guarantee promises.

The fabric of TRACTION TREAD TIRES is of special construction, enabling the fabric to undergo stresses and strains many times greater than those met with in everyday service.

The tread of this tire is of special design. The projections are long and flat and will not readily chip. They are self-cleaning and so constructed as not to break the fabric. See this upkeep reducing tire at your dealer's today.

"The Tire With The Alligator Hide And The Velvet Glide"



INDIANA RUBBER PRODUCTS also include WABASH and INDIANA Tires, Inner Tubes, Inner Liners, Inner Sleeves and Outer Boots, every one of which is guaranteed to give perfect service satisfaction.

The Traction Tread—the Firm Tread.

Write for catalog.

Indiana Rubber & Insulated Wire Co.
Jonesboro, Ind.

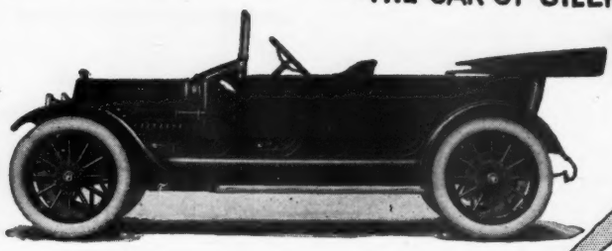
CHICAGO REPRESENTATIVES:
K. FRANKLIN PETERSON
H. V. GREENWOOD
122 S. Michigan Boulevard

EASTERN REPRESENTATIVE:
GEO. R. HALL
22 Imlay Street.....Hartford, Conn.



Lyons-Knight

"THE CAR OF SILENCE"



$2900

The Proposition

Here in brief are a few of the many individual and distinctive features of this car—announced here for the first time. Every element of the Lyons-Knight car is the culmination of years of effort and test—the best that engineering brains, backed by the facilities and materials of ample capital, can afford. Judge these few points:

Outline Specifications

Engine—Lyons-Knight, four cylinder, four cycle, 4½ inch bore, 5½ inch stroke. water cooled.

Horse Power—50

Oiling—Lyons-Knight pressure feed to all bearings, pistons and sleeves regulated in accordance to engine power.

Carburetor—Improved double jet, especially designed, with adjustment on steering column.

Ignition—Dual, water-proof, high-tension magneto.

Clutch—Three plate, raybestos faced.

Transmission—Silent, selective, three-speed, sliding gear type embodied in rear axle housing.

Driving Gear—Worm drive, silent, smooth and always efficient in operation.

Rear Axle—Full floating, Timken bearings.

Brakes—Two sets, double acting, internal and external on 16" rear wheel drums.

Front Axle—Timken drop forged "I" Beam with roller bearings in steering heads and hubs.

Wheel Base—130 inches, tread 56 inches.

Wheels—Wood with quick detachable, demountable rims and 37 x 5 inch tires, front and rear. Wire wheels special.

Famous Knight Engine

During five years of successful use the Knight engine has proved its wonderful stability and endurance. Its famous test by the Royal Automobile Club, of four years ago, has never been equaled, either in the severity of the test or power delivered. In the International Sweepstakes 500-mile race at Indianapolis, May 30th, a Knight car finished fifth. It had the smallest engine in the race, having 250 cubic inches piston displacement against 448 cubic inches of the winner. It was acknowledged by far the quietest, smoothest running car on the track. Its record for economy in tires was remarkable. The water in the radiator registered 130 degrees at the start—130 degrees at the finish. It did not replenish either water, oil or gasoline during the whole race.

The Knight engine has proved in actual service, by the testimony of owners, that it becomes better, more powerful, more efficient, after 100,000 miles of operation.

Worm Drive

"Like continuous coasting," is the term used by one passenger to express the smooth, silent operation of the Lyons-Knight car.

Added to the silent, smooth-running Lyons-Knight engine is another great feature—**worm drive.**

The worm gear insures absolute freedom from noise, roughness, vibration and grinding. Reports of the Society of Automobile Engineers show that while more expensive to manufacture than other gears, it is the nearest approach to 100% efficiency in the delivery of power to the axle. It also becomes better with use—gives more power and efficiency year after year.

"The Car of Silence"

Because of:

Silent Improved Knight Engine,
Silent Worm Gear Drive Axle,
Silent Improved Electric Starter,
Silent Transmission,
Silent Chain for Engine Parts.

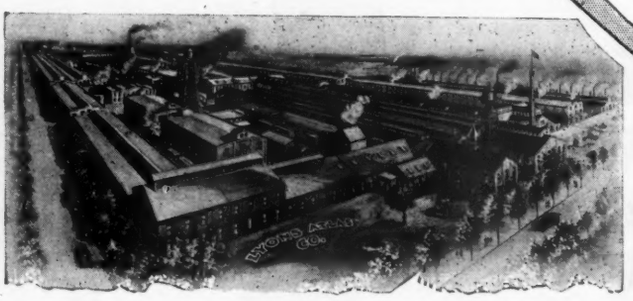
The really startling thing about the Lyons-Knight is its remarkable silence and absolute freedom from vibration. The most delicate woman or child can ride in it for hours at high speed without the slightest fatigue. Noise means excessive friction and wear, and is directly responsible for the fatigue experienced in motoring. All mechanical noises have been entirely eliminated in the Lyons-Knight—the quietest car built. We want you to compare this exceptional car in every detail of construction and equipment with the costliest imported and American cars.

We believe you will find it equally as good—and in the multitude of individual and distinctive features and details, superior. We think you will readily agree no such value has ever been offered among cars of the first grade.

Get the Details

Any description of the details that could be crowded into an advertisement would fail to do justice to the car, since so much would have to be left out. But in justice to yourself you ought to know them before investing $2,000 or $3,000 more than is necessary in purchasing a car that will meet your highest ideals in service, capacity and class. Nor is there any reason why you should be content with a medium grade car when the best is within the reach of every man of moderate means. It is worth your while to study the details of this very remarkable car.

Write for the Lyons-Knight catalogue today.



THE LYONS-ATLAS FACTORY

Including 65 acres, six hundred and twenty-seven thousand square feet of floor space, six miles of railroad with locomotives and cars, giving a capacity for fifty thousand Lyons-Knight cars a year and backed by ample capital to produce this number or more.

Write for Complete Information

The Lyons Atlas Co.

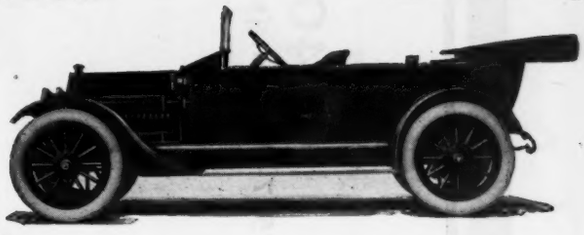
INDIANAPOLIS IND

Lyons-Knight

"THE CAR OF SILENCE"

To Dealers

$2980



You—who have had experience—
Know the greatest argument for any good car are the facts.
We are not making empty promises about the Lyons-Knight car.
We want to give you **facts!**

Here Is What the Lyons-Knight Actually Gives

(1) A big, high-powered car, combining six cylinder smoothness, flexibility and efficiency with four cylinder economy.

(2) A car with more distinctive and individual features—of better design and quality than has ever been offered at $5000.

(3) Silent Knight motor, silent worm drive, giving absolute freedom from vibration, growing better with 100,000 miles of service.

(4) The most complete facilities for manufacture backed by ample capital, insuring prompt deliveries on all orders.

(5) A most aggressive sales policy, including a great national advertising campaign to make the Lyons-Knight first among high-class cars.

(6) A most liberal dealers' proposition backed by extensive local advertising and sales effort from the factory to help every dealer make greater profits from Lyons-Knight cars.

(7) A complete line including large and small four cylinder Knight cars, six cylinder Knight cars, and light and heavy commercial cars with Knight motors.

What more can you ask for in any car? If you have other requirements—ask about them. The Lyons-Knight proposition may include them also.

You can write us.
We can describe the many distinctive and exclusive features of this car.

The catalog will give you some idea of it.

Our dealers' proposition is most liberal from your standpoint.

But the best way to know the whole matter is to get the facts for yourself.

The Lyons-Atlas factory is a reality. The Lyons-Knight car is not an idea—but an accomplished fact—the cars themselves are ready for delivery.

Come—see for yourself.

Sell the car to yourself first.

View every part in the course of manufacture.

Compare facilities, design, materials and workmanship with what any other automobile factory actually offers.

Ride in the Lyons-Knight.

Judge if any car—at any price—offers so much downright motor car satisfaction.

Every experienced dealer that has come to the factory has been fired with enthusiasm by what he saw.

Already we have closed much important territory with the best established, most experienced dealers.

They have been quick to realize the big, profitable factors in this Lyons-Knight proposition.

This opportunity may still be open in your territory.

Write and we will let you know promptly.

Outline Specifications

Gasoline Tank—22 gallon capacity, on upper part of dash over toe board, giving gravity feed direct to carburetor.

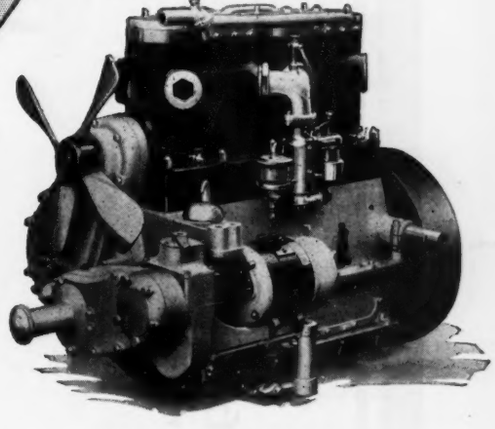
Drive—Left hand with center control.

Bodies—Exclusive design, with maximum room and comfort. Sheet aluminum with extra deep, soft, hand-buffed upholstery.

Finish—Standard colors, dark blue and Brewster green, with black and nickel trimmings.

Equipment—Electric starting and lighting, with dash lamp and two-tone electric horn, patent one-man pantasote top with drop side curtains, special windshield with ventilator, dust cover, speedometer and clock, combination tire holder and trunk rack, two extra demountable rims, coat and foot rails, cocoa matting in tonneau and complete tool and tire outfit.

Prices—Five Passenger Touring Car, $2900; Seven Passenger Touring Car, $2980; Sedan Type, $3900; Berline Type, $4300; f. o. b. factory, Indianapolis, Indiana.



THE LYONS-KNIGHT ENGINE

This four-cylinder Knight engine actually gives the power, smoothness and flexibility of a six-cylinder poppet-valve engine of 50% greater displacement. Its many individual features make it superior in silence, smoothness, reliability, economy and power. Ask for actual proofs by test.

Write for Complete Information

The Lyons Atlas Co.

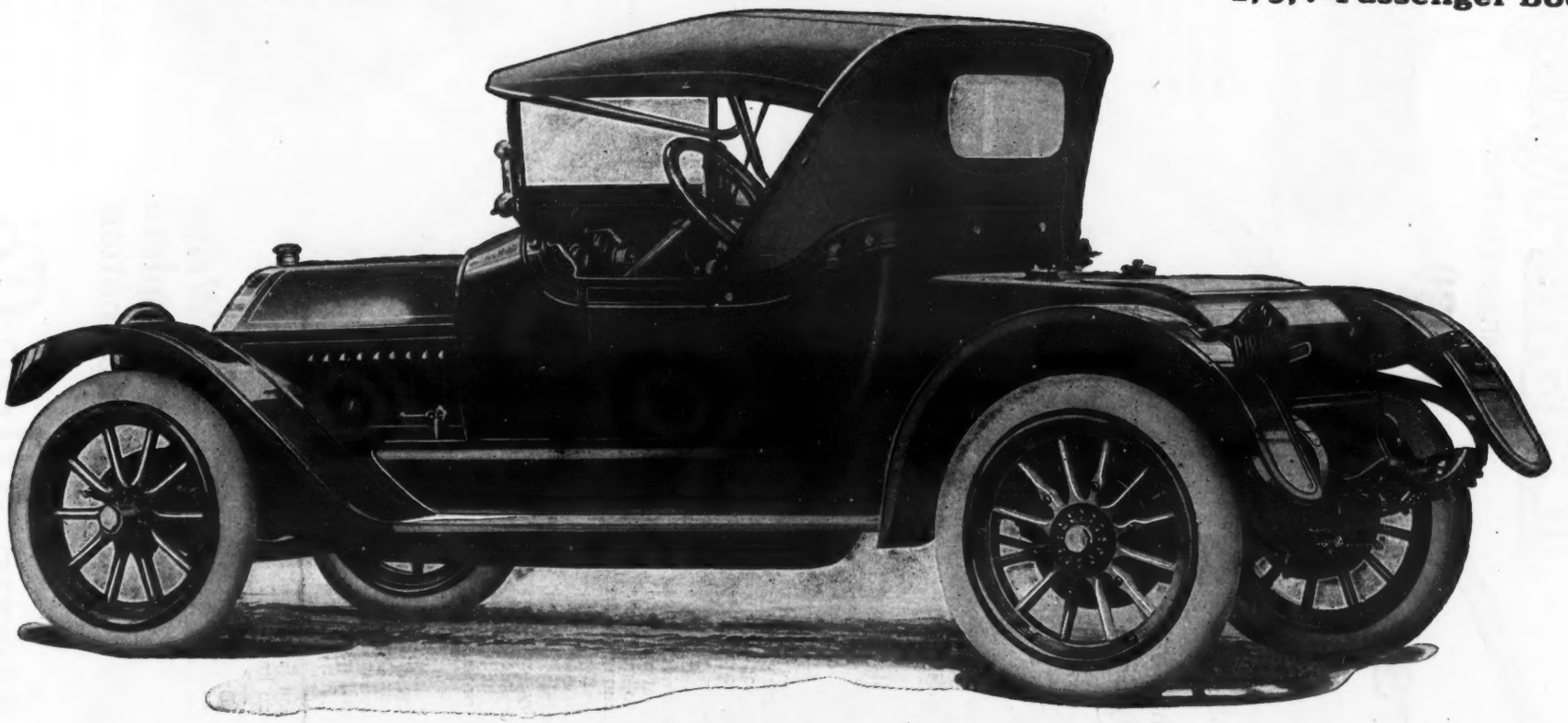
INDIANAPOLIS IND.

When Writing to Advertisers, Please Mention Motor Age.

QUALITY CAR
Premier
PREMIER MOTOR MFG. CO INDIANAPOLIS, IND. U.S.A.

6-60
2, 5, 7-Passenger Bodies

6-40
2, 5, 7-Passenger Bodies



The New Series

PREMIER

America's Greatest Touring Car

Six Cylinders
Electric Lights
Tire Inflator
No Projecting Hinges

Mud Apron
Starter Which Spins the Motor
Left-Side Drive

Clean Running-Boards
Turkish Upholstering
Intake Manifold Primer
Shock Absorbers

An Interesting Fact

No other high-grade manufacturer or his dealers can show the enormous volume and percentage of increase of Premier in 1913.

Because

When the Premier led the high-grade makers with a popular price Six, Premier standard construction and quality were maintained.

Remember Also

A year ago Premier possessed the features which its competitors in their 1914 announcements are claiming as new, such as left-side drive, six cylinders, clean running-boards, etc.

Premier

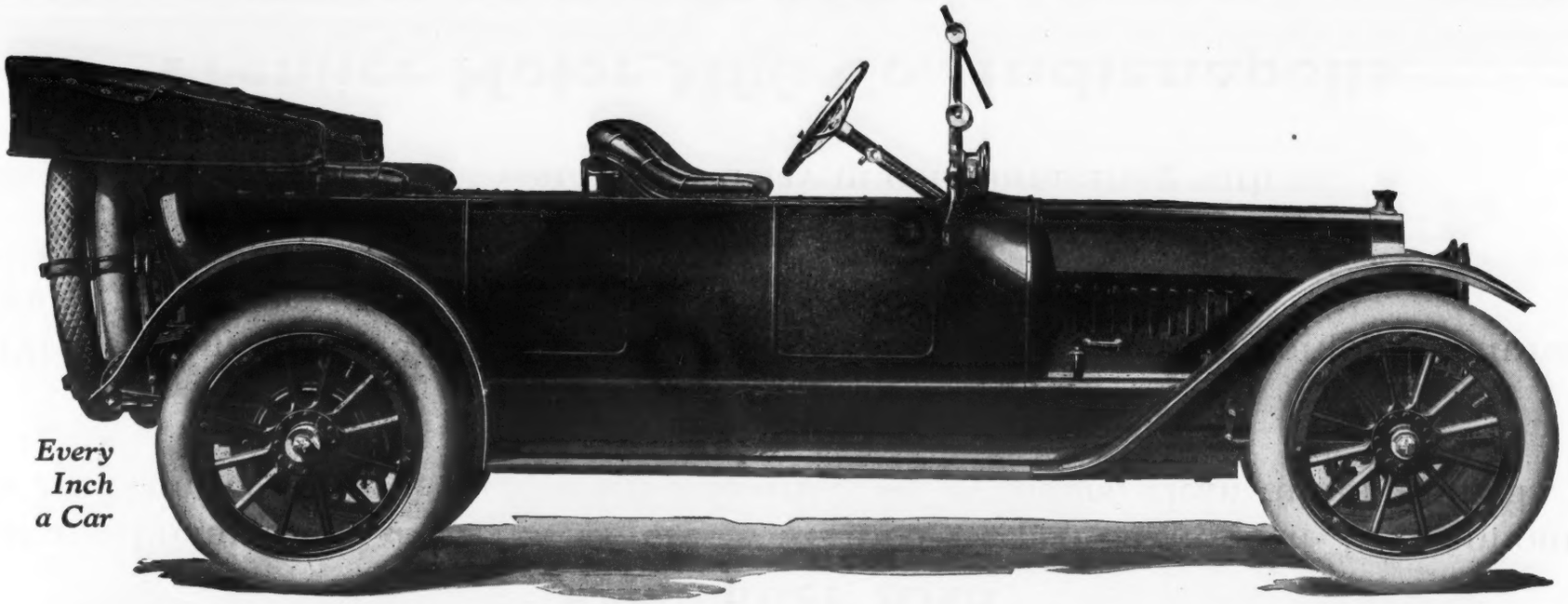
For 1914 is again in the lead. Our new dealers' contracts possess some original features attractive to the dealer.

We Suggest

In case you are interested that you do not delay in communicating with us.

Premier Motor Mfg. Co., Indianapolis

When Writing to Advertisers, Please Mention Motor Age.



Every Inch a Car

A Striking New "Six" at $2350

A new model has been added to the KisselKar line—THE 48 "SIX"—a silent, powerful, well groomed thoroughbred that sets a new level of comparison and is bound to turn discriminating automobile buyers in the direction of the KisselKar.

The announcement of this new KisselKar model is of greater significance than an ordinary announcement because it carries with it a notice of changing conditions in automobile making—the establishment of values and prices upon a more solid and settled manufacturing basis.

A few years ago, when the KisselKar 60 "Six" was announced, it was at once acclaimed the sensational value in "Sixes." It was the first "Six" to respond to the demand for a high-powered six-cylinder automobile at a moderate price. HISTORY IS NOW REPEATING ITSELF.

When Writing to Advertisers, Please Mention Motor Age.

KISSELKAR

Electric Lighted and Started **48 "Six"** **Left Hand Drive Center Control**

In presenting the new KisselKar 48 "Six" at $2350, the Kissel Motor Car Company is again making automobile history as it did with the big KisselKar 60 "Six" five years ago.

The KisselKar 48 "Six" is the latest big thing in six cylinder automobiles. Point for point, it challenges comparison—in construction, performance, comfort and refinement.

The design is strikingly handsome and original, representing the very best ideas of American and European body construction—a design we expect to see freely copied a year hence. In the 48 "Six" we have succeeded in producing a liberally designed, roomy five passenger six cylinder automobile of medium size that fills the gap between the so called "little sixes" and the high powered "big sixes."

It requires but a slight study of the KisselKar 48 "Six" to prove it a worthy exponent of all that is best in automobile construction. Its smooth running, silent, powerful and flexible motor has loads of excess power, and is responsive to every demand. Clean, graceful lines, low hanging body, perfect poise and balance, big roomy tonneau, extra long wheelbase, big tires, extra deep luxuriously upholstered seats combine to make the KisselKar 48 "Six" a car of superlative beauty and riding comfort.

To Owners

The KisselKar line now comprises three striking pleasure car models—the new 48 "Six" at $2350, the 60 "Six" at $3150 and the 40 "Four" at $1850—each an unsurpassed value in its class. An illustrated portfolio giving all details of each model will be sent on request.

To Dealers

Our recently acquired Milwaukee plant will be devoted exclusively to the manufacture of the KisselKar 48 "Six." As this gives us a largely increased output we are in position to add to our list of desirable distributors. If interested, write.

KISSELKAR TRUCKS, 1500 Lbs. to 6 Tons, are used in over 200 distinct lines of business. Write for Truck Catalog.

Kissel Motor Car Company, 121 Kissel Ave., Hartford, Wis.

BOSTON NEW YORK CHICAGO MILWAUKEE KANSAS CITY MINNEAPOLIS
ST. PAUL DALLAS SAN FRANCISCO LOS ANGELES OAKLAND

Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Rochester, Providence, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 300 other principal points throughout America

Features of the New KisselKar 48 "Six"

An entirely new model in design of chassis and body along the very latest ideas of motor car building.

Specially constructed frame hung close to the ground, with large "kick-up" in front and rear—providing plenty of spring clearance and allowing more flexible springs and riding comfort.

Clean and simple construction—at a glance you are impressed with the few number of parts.

Tonneau running board without boxes or brackets to mar the effect of simple completeness.

Rakish new design fenders with rounding tops instead of flat.

Front axle of foreign design with the castor principle, which allows easy turning of car and avoids accidents as the wheels are always kept in line. The construction of this axle also adds strength to the knuckles and main parts.

Large doors 21" wide and 5 passenger tonneau with room to spare.

Deep, low, properly proportioned seats. Backs pitched for extreme comfort—and cushioned with the finest upholstery.

Patented Golde top, which eliminates front brackets. This top is used only on the very best cars and is remarkably easy to put up and take down.

The "cowl" is equipped with a mahogany board on which all instruments are placed—accessible and convenient to line of vision.

Large 4½"x36" tires—giving the car oversize tires for its weight.

Special flexible spring construction which takes up the jolts and jars.

Extra long wheelbase, 132"—which provides space for roomy tonneau and contributes to riding comfort.

Large gasoline tank (24 gal.) and tire irons in the rear.

Left-hand drive and center control.

Electric started. A simple and positive system that makes starting easy and sure.

Electric lighted. Big powerful electric lights of twice the candle power of average cars.

Powerful, easily accessible, long stroke motor, with large crank shafts carefully balanced—capable of developing plenty of excess power. Silent, smooth running, responsive.

Four speed transmission—direct drive on third.

Cone leather faced clutch can be disassembled without removing transmission or motor.

The KisselKar 48 "Six" is fully equipped in every detail and embodies every desirable feature for the comfort and convenience of the car owner.

KisselKar Service Contract

The KisselKar is sold under a written guarantee of service to owners—a tangible, definite and specific contract that clearly stipulates the scope of KisselKar Service and provides for care that forestalls trouble and retards depreciation.

When Writing to Advertisers, Please Mention Motor Age.

Honest Now, Mr. Automobile Dealer Are You Making Enough Money?

Here's what a lot of dealers are up against. Maybe you're in this class. They are doing a good business—selling quite a bunch of cars and making a good profit, *if* they could *hang on to it*. But here's where the trouble comes in. Every time something goes wrong, (fancied or real) with the car of the customer, ting-a-ling goes the phone, or in comes Mr. Customer to have his car fixed up, and, of course, there can be no charge, because he bought it from Mr. Dealer and *he* is responsible.

Now there's just one way to dodge all this kind of trouble—get a car that doesn't need much of this kind of attention. Through all these 20 years of auto building, our one goal has been—make the Haynes perfect—make it so trustworthy and simple that it will stay in running order and give satisfaction through hard use and even abuse in the hands of unskilled drivers.

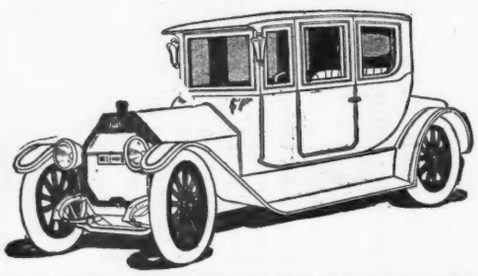
Connect up with the HAYNES —the Car *Without* the "Come-Backs"

We'll be glad to tell you how simple the Haynes is in every part—glad to tell you how carefully each car is manufactured in our own shops or under our direct supervision—glad to tell you the tests which every separate part, and the car complete are required to meet. We'll also be glad to tell you what Haynes dealers say as to the satisfaction given by the Haynes and how little bother they have with "comebacks."

Specifications of The New Haynes

Motor—Bore 4 1-4 in., Stroke 5 1-2 in. L-head Haynes. Cylinders cast in pairs.
Cooling—Centrifugal pump and pressed steel fan.
Wheel Base—Model 26, 130. Model 27, 136. Model 28, 118.
Ignition—American Simms Magneto.
Lubrication—Splash and gravity feed.
Control—Left hand. Vulcan Electric Gear Shift.
Transmission—Selective Type, three speeds forward, one reverse.
Steering Column—Worm and worm gear type.
Clutch—Haynes contracting steel band.
Rear Axle—Full Floating Timken on Models 26 and 27; McCue, Model 28, Gourney Bearings.
Front Axle— I-Beam. O. H. steel heat treated.
Wheels—Artillery type. Funk demountable rims.
Tires—Models 26 and 27, 36 x 4 1-2 Model 28, 34 x 4.
Springs—Front Semi-elliptic 39 1-8 x 2, rear 48 x 2.
Brakes—15 1-4 external and 15 internal Models 26 and 27. 12 and 16 internal on Model 28.
Finish—Indiana dark blue body.
Gasoline Feed—Pressure. Automatic feed.
Upholstery—Buffed leather—deep cushions.
Starting and Lighting—Leece-Neville electrical system.
Dash Equipment—Electric lights, sight oil feed, automatic cut-out for generator, dash light, auxiliary air pressure pump, air gauge and speedometer, Models 26 and 27 have rim wind clock.
Other Standard Equipment—Top, top cover of silk mohair, mechanical tire pump, rain vision ventilating wind-shield, Vulcan electric gear shift, two large electric headlights, electric side lights, electric tail light, full dash equipment, electric starter, generator, 80 ampere hour storage battery, speedometer, horn, coat and foot rails, tire irons, full tool equipment, and one extra demountable rim.







The New Haynes Models Have the Season's Biggest Feature—the Vulcan Electric Gear Shift

Here's another thing a lot of dealers are up against—and maybe this also applies to you. They're handling a good car, gives good satisfaction, customers pretty well pleased, but the drawback is—there is nothing different, nothing distinctive about the car to make people go out of their way to come in and see it.

The new Haynes has a selling wallop that brings the prospects in and helps you put over the sales. In addition to everything that can be desired in the way of comfort, convenience, equipment and prestige of twenty years building—it has the wonderful Vulcan Electric Gear Shift.

Connect up with the

HAYNES

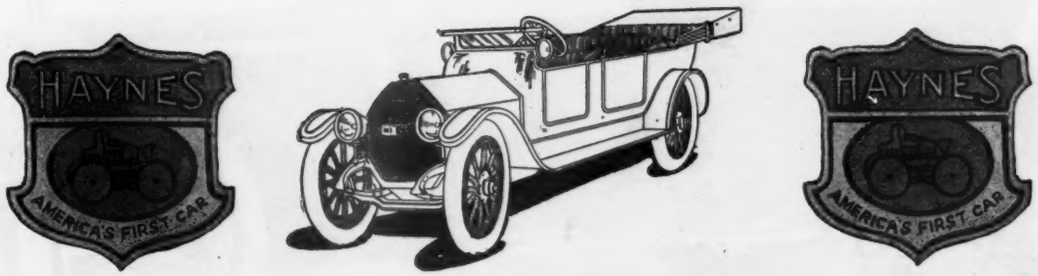
—the Car That Is Always *First*

True to its reputation as pioneer and pacemaker, the Haynes was first to adopt this, the greatest improvement in automobile equipment. Added to the electric self-starter and electric lighting, is everything else in the way of modern equipment—it makes the Haynes the strongest kind of a selling proposition. Read the specifications and see for yourself.

Get After the Haynes Agency Today

If you are in business for money, not merely for your health—if you would like to get hold of the agency for a car that's a live seller, that's famous for its quality and dependability—that stays sold and stops the "profit-killing come-backs"—if you would like to do business with a *stand-by* and a *fixture* in the auto business, insure your business for the future—and if you would like to make the coming year *your biggest year*, write us today about the Haynes, America's First Car and the car with the wonderful Vulcan Elecric Gear Shift.

The Haynes Automobile Co., 2 Main St., Kokomo, Ind.



Does the Maker Know What He is Doing?

IS he making six-cylinder cars because he **knows how,** or only because the demand created by another maker's six has forced him to it?

Is he selling his car on the strength of its equipment, or on the proved merit of the car itself?

WINTON SIX

Long stroke motor, left-drive, center control, electric lights, self-starter, finest mohair top, easily handled curtains, rain-vision glass front, best Warner speedometer, Waltham eight-day clock, Klaxon electric horn, tire carriers, four-cylinder tire pump, demountable rims, full set of tools, German silver radiator, metal parts nickel finished. Fully equipped, **$3250**

Success or Experiment?

Is he equipping an intricate and doubtful self-starter that may cause you a lot of trouble, or is he using one that has years of success to its credit?

Does he flop about from one type of car, one size, one price, to another as fast as the seasons change, or has he shown, by consistently producing some one standard car, that he has an established policy and a successful product?

Is He Here To Stay?

Is his credit good, enabling him to command the best materials and the best equipment on the market, or must he buy only where sellers are willing to take a risk on him?

Is his financial standing sound, so that you may rely upon his guarantee and his promise of service, or is he likely to be out of business within a month after you buy his car?

Every Buyer Ought To Know

These are fair, square, necessary questions. Every car buyer, who seeks the best car he can afford to buy, ought to get the right answers to these questions before he spends his money.

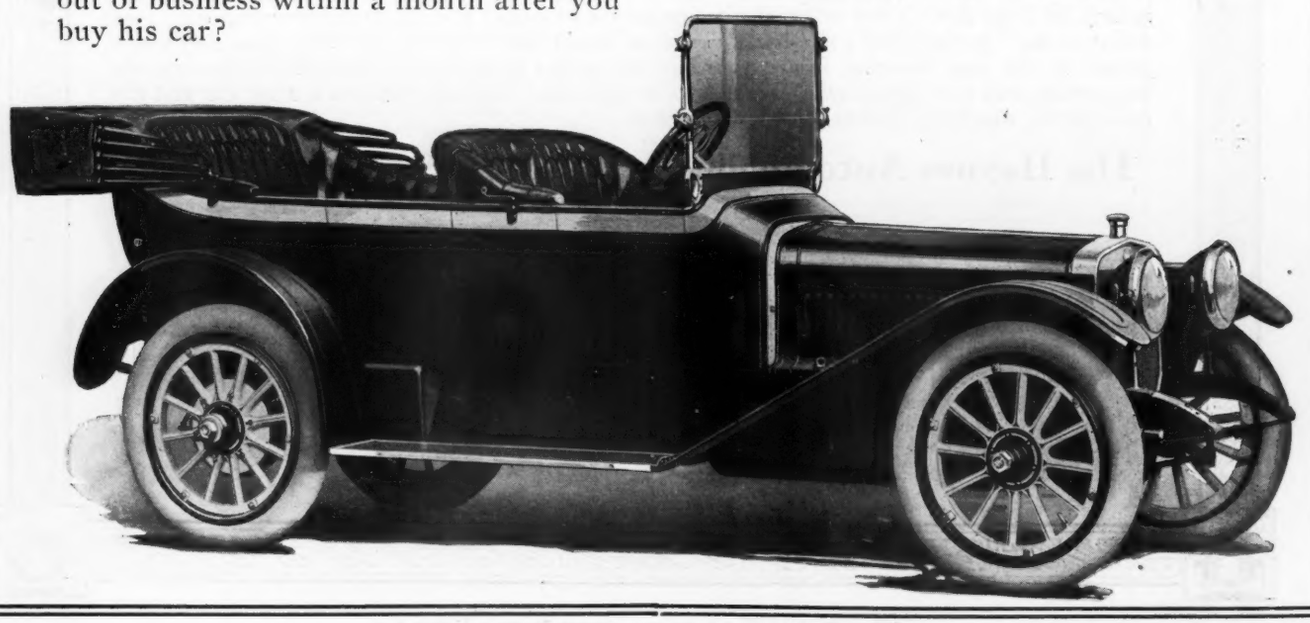
Don't trust to mere reputation or seeming success. Remember that the past year has seen the failure of more than 25 makers who had reputations.

You Need This Book

No car buyer wants to buy a loser. Avoid it by getting the facts. Our booklet on present conditions in the automobile industry will help you to know something about the situation. Ask for Book No. 41; it includes car description.

The Winton Motor Car Co.

424 Berea Road, Cleveland, O.





This is of Vital Interest to you, Mr. Manufacturer!

You certainly know that lubricated springs make a great improvement in the riding qualities of a car. You also know that it prevents the annoyance and squeaky hard riding of a car.

Not many motorists realize that to lubricate the spring leaves is as important as to lubricate any other part of the car. Those who do know it neglect the matter either because they are afraid of damaging the springs or because the cold chisel and hammer method is decidedly troublesome.

KNOWLSON'S SPRING LEAF SPREADER

makes easy and certain the lubrication of the leaves of the springs. This work can be done with the least expenditure of time and energy—eliminates the necessity of jacking up the car.

KNOWLSON SPRING LEAF SPREADERS weigh less than a pound, and are readily adjustable to any springs. They are made of the highest grade drop forgings, are nickel plated, highly polished and well finished. They make a splendid addition to the tool kit that you furnish with your car.

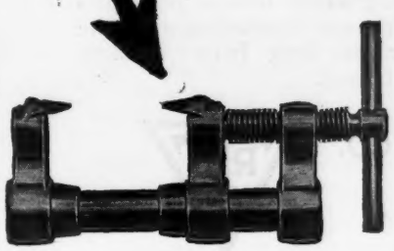
WHY NOT INCLUDE THIS IN YOUR TOOL KIT EQUIPMENT

Impress upon the owner the necessity of using this device and it will tend toward greater satisfaction with the car.

KNOWLSON'S SPRING LEAF SPREADERS ARE GUARANTEED TO BE ABSOLUTELY SATISFACTORY

They cost $1.50 at retail—with discounts in quantity lots.

Investigate this proposition—Clip—and send back the coupon today.



53-H

Spring Leaf Lubricator Co.
ANN ARBOR, MICH.

M. A.

Spring Leaf Lubricator Co., Ann Arbor, Mich.

Gentlemen:

Send me further information concerning Knowlson's Spring Leaf Spreader and your offer to manufacturers.

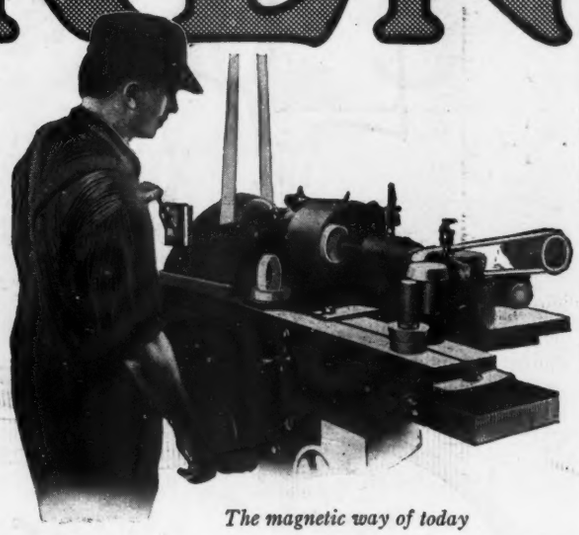
.....

.....

TIMKEN



The way of long ago



The magnetic way of today

In the Grip of the Magnetic Chuck

YEARS ago it was Timken practice to put the heat-treated, hardened steel cup for the Timken Bearing in a chuck that held it firmly at only three points. Then grind a round tapered hole in the center.

But pressure at three points did distort the cup a little bit. When that pressure was released the cup would spring back and the hole would no longer be *exactly* round.

Then a chuck made of heavy springs was used. Springs of equal force pressed over the whole outside surface of the cup. A great advance over three point suspension in a chuck.

Nearly all the cups now came through round. Nearly all! But Timken shop men have mighty little use for that word *nearly*.

Trouble was that some of the cups were very slightly out of round when they came from the hardening room. The chuck springs were forced out a little farther at the high points, not quite so far at the low points.

So the springs pressed a trifle harder on some parts of the cup than on others. After release the hole would be very very nearly, but not quite, round.

And this is how *nearly* was eliminated:—

We stopped grasping the cup by its outside surface. Just ground the back flat and put it up against a strong flat magnet.

That magnet now is the chuck that holds the cup firmly while it whirls and the swift revolving emery wheel grinds the round tapered hole.

There is no rim pressure on the cup. So the round hole stays round when it's taken off the magnetic chuck.

This is just one of a hundred stories that tell how the efforts of a great organization are bent day by day toward perfection of the Timken Bearing. The bearing whose unique principles of design made it 'the one bearing against the field' for motor-car use long before present day accuracy was attained.

THE TIMKEN ROLLER BEARING CO.

Canton, Ohio, U. S. A.

Every Timken Bearing, large or small, is of just one Timken Quality, through and through

123

COMING

The LOZIER "Four"

$2100 [Fully Equipped]

LOZIER answers the rumors that have kept the whole automobile industry in a restless state of expectancy ever since Joseph M. Gilbert was chosen its President and General Manager.

Knowing Mr. Gilbert's past record for doing big things, dealers all over the country have been anticipating some unusual announcement from the new management of the Lozier Motor Company—and here it is—a full seven-passenger touring car with all the characteristics of a **true** Lozier for $2,100.

It shatters all precedent—for **no** manufacturer in Lozier class, in this or any other country, has ever entered this field and produced such a car at $2,100.

Lozier is again the pioneer, as it has been from the beginning; with long wheel base, big wheels, demountable rims, magneto, shaft drive, fore-door bodies, Stream-line design and a score of minor, but important, details.

A year ago it would have been almost impossible for us to produce **this** car at this price. **But** Lozier manufacturing facilities like Lozier cars do not stand still.

At the Lozier plants there is a constant process of improvement going on. New machinery is designed and added, to increase economy of production, to increase the output, or improve the quality. Without the splendid and tremendous Lozier plants, their up-to-date equipment and their loyal employees, no car built with Lozier character and dependability can be made to sell for $2,100.

This $2100 Car Is a "Four"

Behind it stands one of the strongest, one of the oldest and one of the most successful automobile manufacturing organizations of this country, producing a line of cars that has made the Lozier name famous.

Proving its character and dependability are thousands of Lozier vehicles, rendering faithful service to owners, for thirteen years. Realize what this announcement means.

This Lozier car fills a place which no other car made today can occupy.

When this announcement is made to the public it will create immediately intense interest, for it will answer the wish and fulfill the desires of countless thousands of automobile buyers.

It is human nature to want the best and you know hundreds of good prospects, right in your territory, who have looked towards the Lozier with secret envy and desire.

"Some Day I'll Have a Lozier, too"

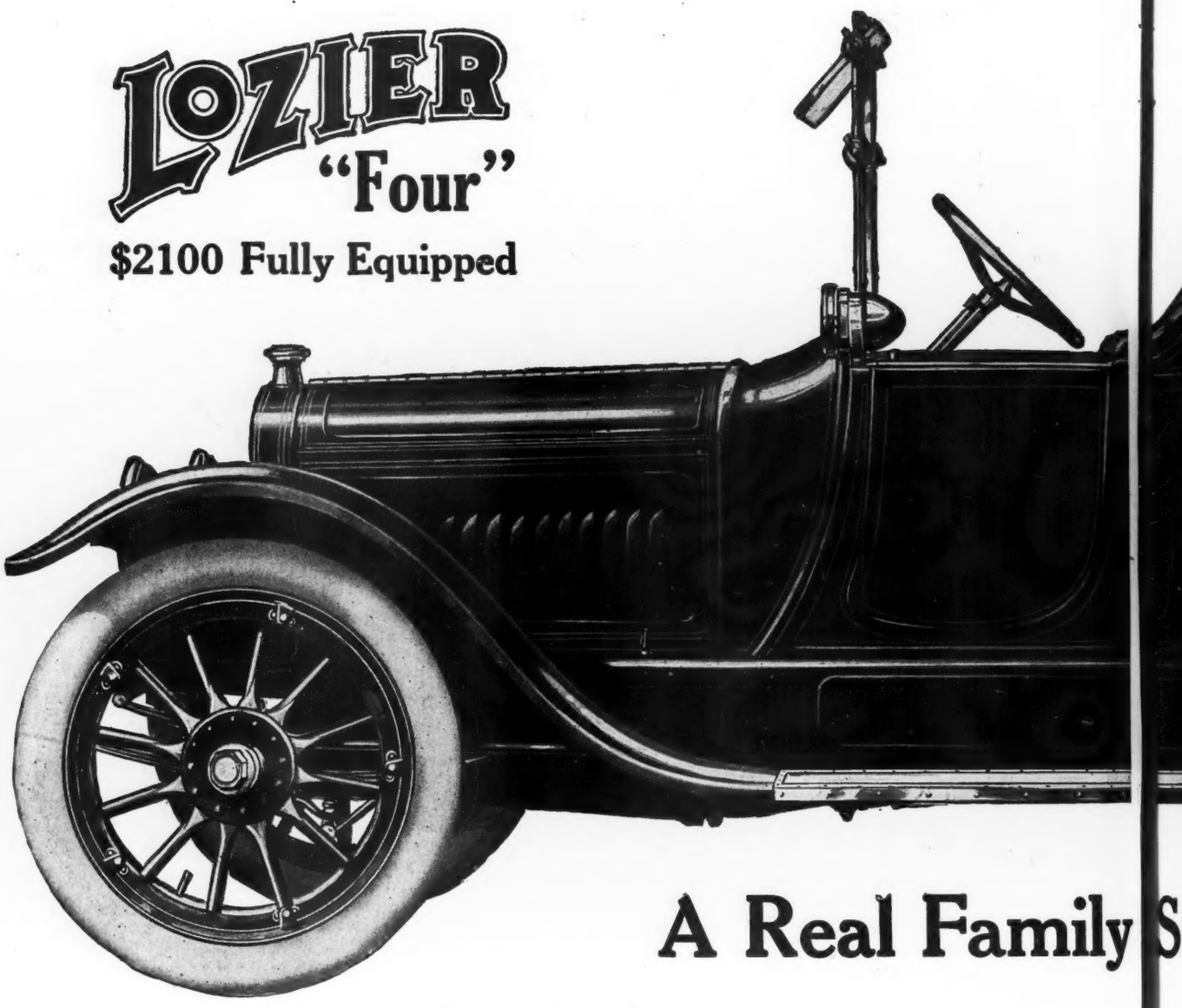
That has been the mental resolve formed by thousands of persons as they sat on their porches and watched the Loziers go by, or were passed on the road. This new Lozier "Four" will meet that demand.

This Lozier "Four" is possible through Lozier designing ability and the perfection of Lozier manufacturing efficiency, which is once more displayed and proved by the introduction of this model.

This new Lozier model is a consummation and a triumph for the Lozier organization and a source of business building and profit producing for the dealers fortunate enough to be enrolled under the Lozier banner.

LOZIER "Four"

$2100 Fully Equipped



A Real Family S

GENERAL SPECIFICATIONS

Four cylinder L head, long stroke motor; 4¼ bore by 6½ stroke; cylinders cast en bloc; lubrication force feed to main bearings and trough splash for connecting rods and pistons.

Valves amply large to give the greatest economy of fuel and valve lifter mechanism all enclosed but accessible by easily removable hand plates.

Engine front-end drive by means of a single silent chain running over the crank shaft, the cam shaft, the pump and magneto sprockets.

Gray & Davis electric starter and lighting generator driven from clutch shaft by silent chain; Bosch magneto for ignition.

Transmission three speeds forward and reverse. Transmission forms a unit with clutch and motor.

Front axle I beam forging with nickel steel knuckles. Rear axle full floating type with bevel gear drive. Road clearance at lowest point of drop, 10¼ inches. The spring suspension is of the Lozier type, full platform rear and semi-elliptic front.

"The Choice of Men Who Know"



ily Service Car

GENERAL SPECIFICATIONS

Brakes of the internal expanding type on the rear wheels, away from dirt and grit and trouble, but easily accessible for adjustment. Bands arranged side by side.

Twenty gallon gasoline tank is suspended in the rear; fuel supplied to carburetor by pressure system —the positive unfailing Lozier type of pressure pump is used.

Steering gear worm and worm wheel type. Hand wheel 18 inches in diameter with Lozier rubber covered rim. Left side drive—center control with ball type change speed lever.

Wheel base, 120 inches; standard tread, 56 inches; wheels, 36 inches; tires, 36 by 4½ all around. Spare tires carried in the rear; running boards are clear of all obstructions. Hood and cowl merge in one continuous slope, securing the beautiful streamline effect first introduced into this country on Lozier cars a year ago, and now seen on the best foreign cars. Another feature which adds decidedly to the distinguished appearance of the Lozier "Four" is its crowned fenders.

At the price of $2,100 is included the famous Gray & Davis Electric Starting and Electric Lighting System with full set of Electric Lamps. The equipment is complete; top, built-in wind-shield, speedometer, demountable rims, extra rim, tire carriers.

Why It Is a "Four"

IN announcing this new Lozier "Four" at $2,100, it is, of course, very obvious to the trade that there is some vital reason for making it a "Four." And there is. A very simple and logical one. Lozier cars, heretofore, have been in a price field that permitted the building of a successful "Six." Lozier "Sixes" have always been admitted to be *successful* "Sixes," as you know. But—and here's the thing in a nut shell—there is a point in the size and cost of a motor car where a "Four" becomes a more efficient, more serviceable and more economical motor than a "Six." There is no better evidence of this than the known mechanical mistakes of others.

Lozier high-powered four and six-cylinder cars have embodied in them fifteen years' experience, and we do not hesitate to say **emphatically** that we believe it is absolutely impossible to build a six-cylinder car for $2,100, or anywhere near that price, that will compare, point by point, with this Lozier "Four." Certainly if anyone could do it, the Lozier Motor Company, with its vast experience in manufacturing both "fours" and "sixes," could.

This new Lozier "Four" at $2,100 could just as easily have been made a six-cylinder car. And we could have made just as much profit on it, for it is only a question of robbing one part of the car to put it on another—and in doing so we would, for a short time, have sold many of them to that class of uninformed buyers who insist on a "Six" irrespective of price.

Men who know the honest policy that has made the Lozier renowned for reliability, service, safety and luxurious comfort, would not have been satisfied.

Right here we want to make a prediction.

We predict that within a short time, every six-cylinder car on the market at around two thousand dollars will be superseded in demand and sales by four-cylinder cars. We predict that any high-grade manufacturer who puts out a car in the same price field as the new Lozier "Four" for 1914, will produce a four-cylinder car.

Four-cylinder and six-cylinder cars each have their features and advantages, but each in its own particular field, and their respective fields are well defined.

The field in which a car built like the new Lozier "Four" meets every requirement is a field of its own.

There are six-cylinder cars sold for about the price of the Lozier "Four," but somewhere they have been stripped of their vital elements, merely for the sake of saying, "This is a six." A six-cylinder car possessing the characteristics of Lozier "Sixes" never has been built and sold for less than we ask for them, and we know why, through years of successful experience in building both "fours" and "sixes."

Therefore, when we determined to produce a car at about two thousand dollars that would give Lozier service at an economical upkeep expense, we built this "Four" in the firm belief that it would give better, more continuous and longer service to owners at less expense than any six-cylinder car that sells for anywhere near its price.

It required nine years to build the first Lozier four-cylinder car, which is still running on the streets of Brooklyn, New York. That is history now, but Lozier methods have been proved good and we have not changed them.

The earmarks of Lozier design and construction are prominently apparent on this new model. It belongs to the Lozier family. It bears the Lozier name and, therefore, it **must** have Lozier character, integrity and distinction built into it.

All these essentials have been built into this Lozier "Four" to sell for $2,100, a price at which a six-cylinder car built on the same lines—the Lozier way—cannot be built.

Deliveries After January 1, 1914

Contracting Begins Immediately

LOZIER MOTOR CO., DETROIT

ANOTHER PROMINENT USER OF HYATT QUIET BEARINGS



MR. E. W. WINANS, Engineer in Charge, Dayton Plants, Maxwell Motor Company

HYATT QUIET BEARINGS



The Short Series, High Duty Type, of the Hyatt Roller Bearing is furnished in shaft diameters from one to three inches inclusive, and in lengths from one inch upward. The Long Series is furnished in the same diameters and in lengths from two to three and one-half inches.

Special diameters and lengths to meet individual requirements, consistent with proper engineering practice, will be furnished promptly.

Short Lengths are made possible in the High Duty Type through the use of nickel steel rollers, properly heat treated and ground, operating on solid inner and outer steel casings, also heat treated and ground. Heavy loads can thus be concentrated on short lengths.

HYATT ROLLER BEARING CO.

DETROIT. MICHIGAN

WORKS. NEWARK NEW JERSEY







SOUTH BEND, IND.
GOSHEN, IND.
TOLEDO, O.
FREDERICK, MD.
GETTYSBURG, PA.
BEDFORD, PA.

REPUBLIC
STAGGARD TREAD TIRES

Winners in Great Relay Run

The Boy Scouts of America on June 24 were entrusted by President Wilson with a message to Mayor Carter Harrison at Chicago. Four days later the message was delivered on time for the formal opening of the Olympic games. Accompanying the Scouts was the Staver-Chicago News car, the only automobile to make the entire trip. When the press car was equipped, Republic Staggard Tread Tires were selected because of their reputation for staying qualities and they lived up to their reputation as

The World's Quality Tires

The trip was especially trying because of the minimum speed which had to be maintained from start to finish. Over mountains, through mud and under terrific road conditions, the Staggard Treads made the trip without a single mishap, finishing with the original air—convincing evidence that they are the best mileage tires in the world today.

THE REPUBLIC RUBBER CO., Youngstown, Ohio

Branches and Agencies in the Principal Cities

REPUBLIC STAGGARD TREAD, Patented Sept. 15, 22, 1908

Standing at the rear of the auto are John O. Seys and Lambert G. Sullivan, Chicago News representatives, both of whom made the entire trip.

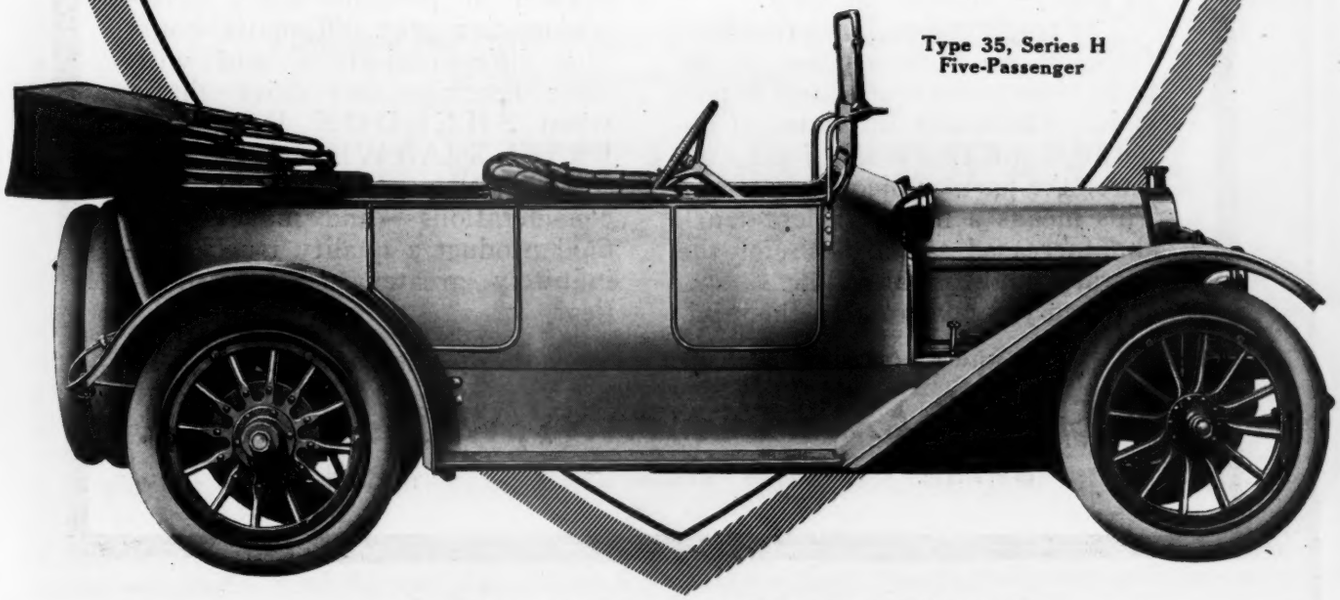


CLEVELAND, O.
YOUNGSTOWN, OHIO. HOME OF REPUBLIC TIRES
PITTSBURGH, PA.

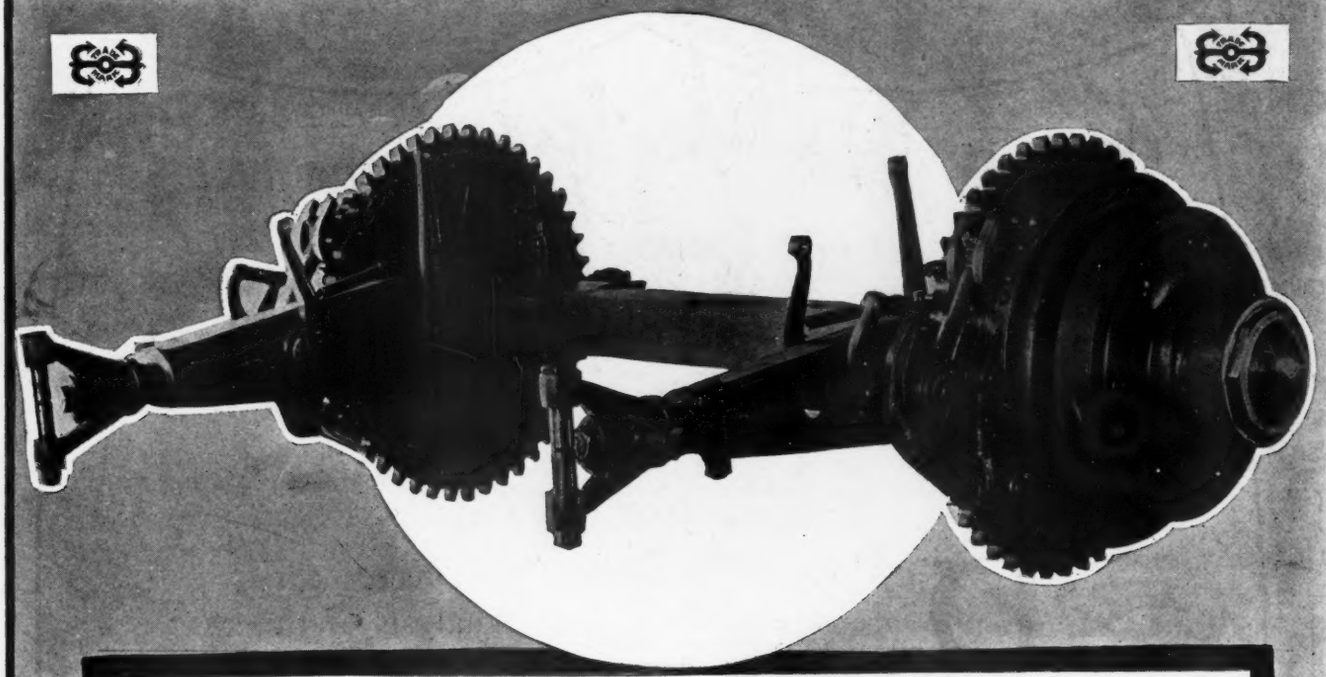
MERCER

DEALERS' agreements for Mercer cars are now being made. Analysis of the automobile demand shows a decided tendency toward high-grade cars of medium weight. Mercer cars meet this demand in every respect, and Mercer dealers are assured of a steady and increasing business. Progressive and reliable dealers are wanted in unallotted territory. Inquiries will receive prompt attention.

Mercer Automobile Company
800 Whitehead Road **Trenton, N. J.**



Type 35, Series H
Five-Passenger



Insist on Brakes Where Brakes Should Be — Next the Wheel

Efficient brakes are most certainly necessary; but proper location for the brakes is every bit as important.

SHELDON DOUBLE BRAKE REAR WHEEL EQUIPMENT has extraordinary features—both brakes are on the rear axle taking all the strain from the chain and doing away with 90% of the Jack Shaft trouble. One set is operated by pedal—the other by lever.

The reaction due to the frictional force on the brake surface should be as close to the road wheel as possible. The closer the point of application of the brake force, the fewer the parts subjected to strain. This means a more efficient truck and increased safety both for the operator and for the public.

When you cut down to the minimum the number of parts subjected to strain you increase the efficiency of the brake. Obviously, the shortest distance between two points is the most effective designing.

Why then, Mr. Engineer, do you still burden your mind with consideration of propeller-shaft, bevel-pinion, ring-gear, differential-housing, differential-gears, and with their bearings and drive-shafts when SHELDON DOUBLE BRAKE REAR WHEEL EQUIPMENT relieves you of all these considerations — and makes your final product a quality truck with infinitely greater sales possibilities?

Write us today for further information on this vital subject of efficient braking

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

Chicago Office:
68 E. 12th St.

San Francisco Office:
444 Market St.

Detroit Office:
1215 Woodward Ave.

122 M

The Knight Motor Best

Poppet valve motor in official test falls far below the Knight record

This is the story of two 38 horsepower automobile engines—one a six-cylinder *poppet valve* motor of 1913 design, and the other a four-cylinder *Knight sleeve valve* motor built in 1909—four years ago.

The poppet valve motor was tested by the Automobile Club of America—the Knight by the Royal Automobile Club of England.

The poppet valve motor was under observation 300 hours—*the Knight for 320 hours.*

The maximum power of the poppet valve was 44.9—*the Knight 59.*

The average power of the poppet valve was 35.7—*the Knight 53.*

The minimum power of the poppet valve was 28.7—*the Knight 51.*

At the end of the tests the poppet valve motor was found to be delivering less power than at the beginning, while the Knight showed considerably more.

During the test of the poppet valve engine, valves were twice adjusted when the power fell off—*during the test of the Knight motor no adjustments to the mechanism were made at any time.*

It is conceded that the poppet valve motor which was thus tested is one of the most highly developed poppet valve engines manufactured; that the test was conducted by the Automobile Club of America is proof that it was accurate. Hence the superiority of the Knight type motor has been proven *by the poppet valve itself,* and again supports the statement that—

The Stearns-Knight "Four" is better than any poppet-valve "Six," and that—

The only car better than the Stearns-Knight "Four" is the Stearns-Knight "Six"

THE F. B. STEARNS COMPANY

Cleveland, Ohio

Branches and Dealers in 125 Cities

The most sensational feature of the 500-mile Indianapolis Decoration Day race was the performance of a 25 H. P. Knight-motored car, which, although by far the smallest car in the contest, ran consistently throughout, averaged nearly 70 miles an hour, and did not take oil or water from start to finish. It defeated 19 high-powered foreign and American machines, and finished fifth behind cars of far greater power.



NOBBY TREAD & CHAIN TREAD

Dealers who handle "Nobby Tread" and "Chain Tread" tires are piling up business brought by the fastest selling and greatest service-yielding tires on the market.

These two types are the most widely used non-skid tires ever offered to motorists.

In less than three years' time the output of "Nobby Treads" at the United States Company's factories has more than quadrupled.

This tire made good from the start and today ranks as the biggest seller in the tire field.

The "Chain Tread" with an eighteen months' record behind it, has practically monopolized the popular-price, non-skid field.

Observation where motor cars congregate will afford conclusive proof of the universal demand for these two wonderfully efficient tires.

They prevent skidding; and what is more, the thick, tough treads yield extra mileage and reduce punctures.

Motorists want them; YOU should sell them.

Real Service Branches in the Leading Cities

EASTERN DISTRICT

ATLANTA, GA. ..... U. S. Tire Co. ..... 21 Houston St.
BALTIMORE, MD. ..... U. S. Tire Co. .... 1100 Cathedral St.
BIRMINGHAM, ALA. ..... U. S. Tire Co. ..... 423 So. 20th St.
BOSTON, MASS. ..... U. S. Tire Co. ..... 863 Boylston St.
BUFFALO, N. Y. ..... U. S. Tire Co. ..... 735 Main St.
CHARLOTTE, N. C. ..... U. S. Tire Co. ..... 14 So. Church St.
HARTFORD, CONN. ..... U. S. Tire Co. ... Allyn and High Sts.
JACKSONVILLE, FLA. ..... U. S. Tire Co. ..... 804 Main St.
NEWARK, N. J. ..... U. S. Tire Co. ..... 276 Halsey St.
NEW YORK, N. Y. ..... U. S. Tire Co. .. Broadway & 58th St.
PHILADELPHIA, PA. ..... U. S. Tire Co. ..... 329 N. Broad St.
PITTSBURGH, PA. ..... U. S. Tire Co. .. 5929 Baum St., E. E.
PROVIDENCE, R. I. ..... U. S. Tire Co. ..... 18 Snow St.
RICHMOND, VA. ..... U. S. Tire Co. .... 709 West Broad St.
ROCHESTER, N. Y. ..... U. S. Tire Co. ..... 195 East Ave.
SAVANNAH, GA. ..... U. S. Tire Co. ..... 307 Bull St.
SYRACUSE, N. Y. ..... U. S. Tire Co. ..... 117 W. Taylor St.
WASHINGTON, D. C. ..... U. S. Tire Co. ..... 1303 H St.
WORCESTER, MASS. ..... U. S. Tire Co. ..... Graphic Arts
WILKESBARRE, PA. ..... U. S. Tire Co. ..... 60 Main St.

CENTRAL DISTRICT

CHICAGO, ILL. ..... U. S. Tire Co. .... 1222 Michigan Ave.
CINCINNATI, O. ..... U. S. Tire Co. ..... 1121 Race St.
CLEVELAND, O. ..... U. S. Tire Co. ..... 1908 Euclid Ave.
COLUMBUS, O. ..... U. S. Tire Co. ..... 89 N. Third St.
DALLAS, TEX. ..... U. S. Tire Co. .... 2022 Commerce St.
DAYTON, O. ..... U. S. Tire Co. Second & Jefferson Sts.
DENVER, COLO. ..... U. S. Tire Co. . 215-217 Sixteenth St.
DES MOINES, IOWA ..... U. S. Tire Co. ..... 406 W. 9th St.
DETROIT, MICH. ..... U. S. Tire Co. . 245 Jefferson Ave., E.
GRAND RAPIDS, MICH. ... U. S. Tire Co. ..... 17 Library St.
HOUSTON, TEX. ..... U. S. Tire Co. .... 706 San Jacinto St.
INDIANAPOLIS, IND. .... U. S. Tire Co. .... 527 N. Capitol Ave.
KANSAS CITY, MO. ..... U. S. Tire Co. ..... 1815 Grand Ave.
LOUISVILLE, KY. ..... U. S. Tire Co. ..... 904 S. Third St.
MILWAUKEE, WIS. ..... U. S. Tire Co. .... 454 Milwaukee St.
MINNEAPOLIS, MINN. ..... U. S. Tire Co. 1522-24 Hennepin Ave.
NEW ORLEANS, LA. ..... U. S. Tire Co. ..... 609 Baronne St.
SAN ANTONIO, TEX. ..... U. S. Tire Co. ..... 433 Main Ave.
ST. LOUIS, MO. ..... U. S. Tire Co. ..... 3149 Locust St.
TOLEDO, O. ..... U. S. Tire Co. ..... 218 Erie St.

WESTERN DISTRICT

BUTTE, MONT. ..... U. S. Tire Co. . 1st & Van Buren Sts.
FRESNO, CAL. ..... U. S. Tire Co. ..... Park & Idaho Sts.
LOS ANGELES, CAL. ..... U. S. Tire Co. ..... Masonic Temple
PHOENIX, ARIZ. ..... U. S. Tire Co. ..... 923 Grand Ave.
PORTLAND, ORE. ..... U. S. Tire Co. ..... 84 Seventh St.
SALT LAKE CITY, UTAH. U. S. Tire Co. . 132 E. Second South
SAN FRANCISCO, CAL. ... U. S. Tire Co. .... 636 Van Ness Ave.
SEATTLE, WASH. ..... U. S. Tire Co. ..... 814 E. Pike St.

UNITED STATES TIRE COMPANY

Overland

Making Money for the Dealer

THE business of selling automobiles has settled down to be a business. Each succeeding year brings out new and more competition. The modern automobile is as staple as steel. In 1914 dealers will find themselves face to face with competition as keen and as active as in any other staple line of business—such as hats, shoes, clothing, machinery, etc., etc.

They must therefore, by necessity, adjust themselves, their business, their way of conducting their business, and their organization accordingly. They must, above all other things, concentrate and intensify their selling activities in every populated section of their territory.

The Willys-Overland Company have, from year to year, made it possible, practical and profitable for its dealers to successfully do business on this basis. The selling price and cash value of each new model has been placed far beyond competition. Each year we have been in advance, particularly from a selling standpoint, of any car made.

We give our dealers more practical co-operation, more advertising, more assistance from factory representatives, and a more saleable article than any other manufacturer in the business.

The dealer who handles the 1914 Overland will have the most rapid selling, non-competitive, and profitable car made.

Wait for our 1914 announcement; August 16th.

The Willys-Overland Company

Toledo, Ohio

FORD OWNERS are Buying THE BOSTON STARTER

Why?

You bought your Ford car because its simplicity, economy and ease of operation made a strong appeal to your buying judgment. You can increase the utility of your Ford and get even greater benefit from your investment by equipping it with the BOSTON STARTER.

The BOSTON STARTER is a mechanical device, made especially to start the FORD motor. It can be easily and quickly installed by any automobile driver and does not affect the appearance of the car. All its parts are beneath the hood, except the starting handle which is on the dashboard. One pull on this starting handle will spin your motor instantly regardless of temperature.

All the power of an acetylene or electric starter without the expense or annoyance. Write us for our catalog.

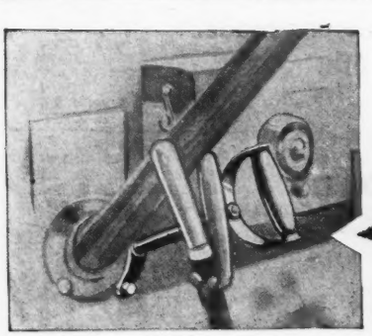
Automatic Appliance Company

172 Columbus Ave., BOSTON, MASS.

GEO. R. WITHINGTON,
271 Canal Street, Providence, R. I.

WORCESTER AUTOMOBILE CO.,
10 Warren Street, Worcester. Mass.

J. VERNER ANDERSON,
Room 715 Conn. Mutual Bldg.
Hartford, Conn.



One pull on this handle starts your motor



THE STURDY

STUTZ



MADE GOOD IN A DAY

Announcement of the Stutz Series E Cars—four and six cylinder

No radical mechanical changes—they were not necessary

The Stutz has been given every test anyone could ask or demand.

It has been sent up against all comers in the hottest races of the world. Racing is subjecting a car to every possible disadvantage in the shortest possible space of time. Out of such tests comes either a car or a memory.

Harry C. Stutz, designer of the Stutz, built his first car in five short weeks, and it finished the first 500-mile race at Indianapolis without even a mechanical adjustment, and jumped into fame over night.

Since that time the Stutz has been entered in thirty-five races, and has to its credit twenty-five victories. It holds the track record for 200 miles. The 500-mile race at the Speedway, Indianapolis, is conceded the most difficult of all races. Any car that even finishes such a race possesses unusual merit.

In 1912, the second 500-mile race, the Stutz landed fourth and sixth places against cars some of which had nearly twice its piston displacement.

The 1913 500-mile event credits the Stutz with third place. Its consistent racing record is equalled only by the service it has rendered to individual owners. Out of all the racing tests has come a better and a truer Stutz. It has proved to everyone that it possesses speed, power, stamina, staunchness, security, safety and strength.

The Stutz is a car of fundamentals which embodies known, tested and proved principles of motor car building and motor car service.

Stutz Features

A Digest of the Peers

1 Dependable Electric Starter.
2 Lighting System—Remy electric generator with storage battery
3 Cone clutch
4 4¾ x 5½ T-head motor in 4-cylinder models; 4x5 T-head motor in 6-cylinder models
5 Stutz special rear system
6 Timken front axle
7 Gemmer steering gear
8 Force feed oiling system through hollow crank shaft.
9 Tires 34 x 4 1-2.
10 Black and nickel trimmings throughout.

Stutz Cars are made in both four and six-cylinder models.

New models now ready

While we have not made any radical changes—they were not necessary—still we found it possible to add a few more refinements and conveniences—making these new models even more desirable than the previous Stutz cars.

For instance, the bodies of the touring cars are larger, roomier, and even more comfortable than heretofore. The upholstering will be generally more luxurious, and the springs a little longer.

The electric starting, lighting and ignition systems employed in the Stutz are separate units, thus eliminating any chance of complication. The self-starter is so simple that a child can understand it. It works quietly and certainly. Electrical experts regard our installation as the simplest, and therefore the best, on the market.

All the special Stutz features that insure strength, speed, sturdiness, ease of operation, have been retained.

Financial responsibility back of the Stutz

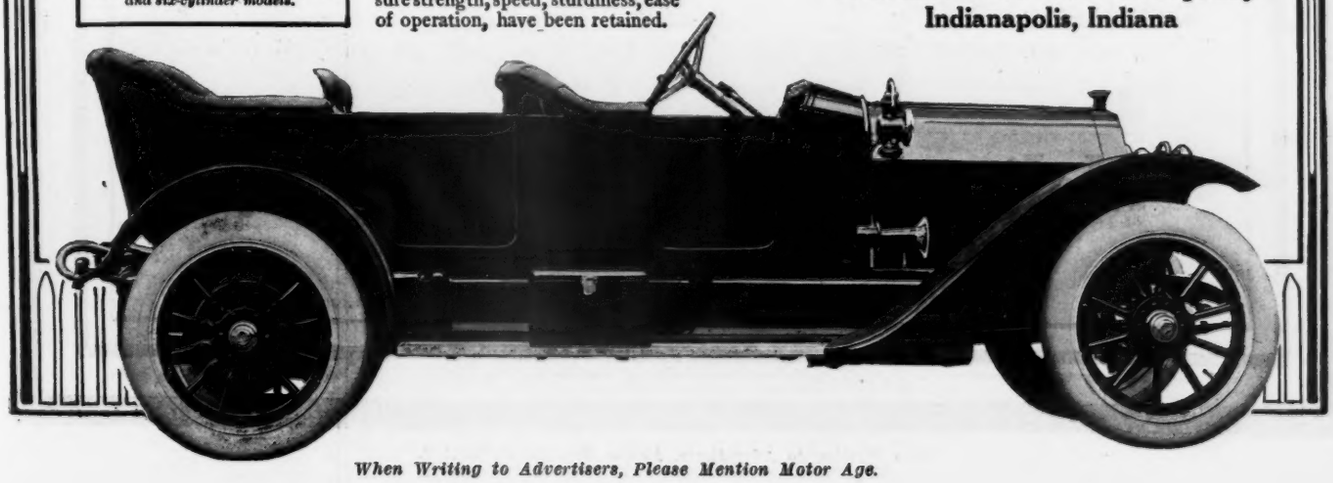
Back of the Stutz car is an institution that is substantial, solid and financially responsible.

Our method of manufacture, as well as the sales distribution, has ever been safe, sane and economical—always with the idea of giving each Stutz owner full measure for his money.

If you are in the market for a car let us know and we will put you in touch with the nearest Stutz dealer—and also send you our new Series E catalog, No. A-2.

There are a few points where we are not now represented. We invite correspondence with responsible dealers.

Stutz Motor Car Company
Indianapolis, Indiana



THE CAR OF UNFAILING SERVICE

Dreadnought Moline M-40

New Series

A Proven Car. Not a Radical Change. Not an Untried Idea.

Mr. Dealer, this is written to you.

You realize that more care and judgment than ever before must be used in selecting the car you will sell for the coming season.

The next year will see a wonderful change in the line-up of manufacturers. Many of the strongest will drop back while many of those now in the background will move up.

Be sure you are lined up with the comers!

This new feature and that will be played up to you every day as the reason you should be selling a certain car.

We believe this will be a season of conservatism on the part of the buyer. We believe a safe and sane development based on using only the most thoroughly proven improvements is best.

We do not "grab every new stunt" until it has been proven absolutely reliable.

Specifications.

Engine—Long stroke, 4½x6, 40 H. P.
Double Ignition—Two complete, separate units.
Cone Clutch—Leather faced, with cork inserts.
Transmission—Sliding gear, three speeds forward and reverse.
Axles—Front, "I" beam; rear, full floating with weight carried on double annular ball bearings.
Steering Gear—Worm and sector type, fully adjustable.
Tires—36x4.
Wheel Base—124 inches.
Springs—Rear, full elliptic, front semi elliptic.
Gasoline Capacity—20 gallons.
Upholstering—Hand buffed leather over genuine curled hair and turkish springs.
Running Boards—Entirely free, no boxes, linoleum covered, metal bound.
Standard Equipment—Moline mohair top, top cover and side curtains. Rain vision wind shield. Ward-Leonard starting and lighting system, gasoline gauge on dash, dash light illuminating gasoline gauge and speedometer, Stewart 60-mile speedometer, electrical indicator, Firestone demountable rims with one extra, foot rail, robe rail, tire irons, set of tools, pump, jack, tire repair kit.
Price—$1950 f. o. b. factory.

Our customers and yours want cars that they can depend upon in every detail. We do not care to risk future dissatisfaction. Do you?

Look over these specifications, Mr. Dealer. Compare, criticise, make any investigation you wish. It is worth your while.

Then write or wire for our dealer's proposition. Let us tell you how we helped our dealers last season and how we will help you.

Moline Automobile Company

40 Keokuk Street, East Moline, Ill.

TRANSMISSIONS STEERING GEARS

LOOK!

SUPREME PEERLESS

R. D. CHAPIN, PRESIDENT
H. E. COFFIN, VICE PRES.
F. O. BEZNER, VICE PRES.
H. B. JACKSON, SEC. TREAS. & GEN. MGR.

HUDSON MOTOR CAR COMPANY

CABLE ADDRESS HUDSONCAR

DETROIT, MICH., U.S.A. June 27, 1913.

The Warner Gear Co.,

Muncie, Ind.

Gentlemen:-

You will be interested to learn that our inspection records show a rejection of only .513% out of the 6500 transmission gear sets (52,000 gears) used last season. This is exceptional and speaks well for the accuracy of your product. Only .06% of the gears returned show defective machine work. The balance (.453%) are either soft or chipped, some through ill-usage, I fear. The gears are absolutely inter-changeable; and this is aided by the accuracy with which you have held the gear centres. Our limits of plus or minus .002" have never been exceeded, to my knowledge.

From an inspection standpoint it is very gratifying to deal with such material. I have yet to see your equal in the transmission business.

Yours very truly,

HUDSON MOTOR CAR COMPANY,

Chief Inspector.

R/S

WARNER GEAR CO.
MUNCIE IND.

DETROIT OFFICE - 628 FORD B'L'D'G.

DIFFERENTIALS CONTROL & CLUTCHES



Next week begins the national advertising of Continental Motors. Twelve of the leading weekly and monthly magazines are going to tell the general public what you—what every car owner—everybody connected either directly or indirectly with the automobile industry already knows—that Continental Motors are America's Standard.

Continental advertising is going to make the Continental Motor and its superiority a household word—on the tongue of everybody who reads and rides.

It is going to make still quicker and easier the selling of cars and trucks equipped with Continental Motors.

Continental Motors are going to be a bigger selling asset than ever.

Continental Advertising is going to tell the public the history of ten successful years in which 75,000 Continental Motors have carried 75,000 car owners over many millions of easy miles.

It is going to tell the public how Continental Motors, with all their silence, won the slogan, "Powerful as the Nation."

If you are representing a car or a truck built around the Continental Motor, **cash in on Continental advertising.** Advertise it locally. It is going to help sell cars.

For the motor is the vital, the most important single factor in a motor car. It will be the basis by which a car is judged and sold, because it represents more than 20% of the maker's cost, and 50% of whether the car is a good or bad investment.

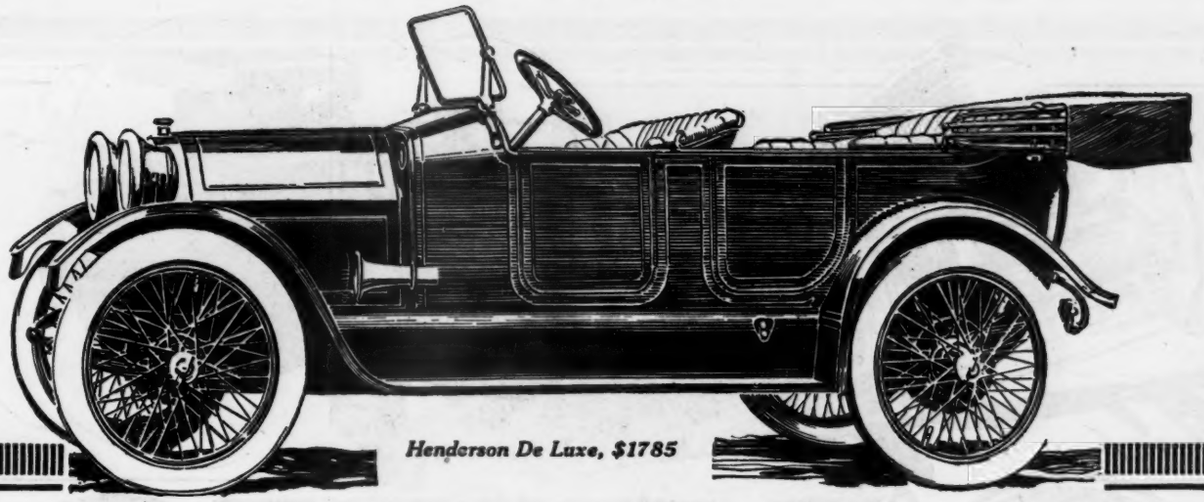
If you do not represent a Continental-powered car, get one. You won't regret it. Over half a hundred makers of both pleasure cars and trucks have specified more than 40,000 Continental motors for 1914.

Now Is the Time. Next Season Is Almost Here.

Continental Motor Mfg. Co.

Largest Exclusive Motor Builders in the World

Factories: Detroit, Muskegon, Mich. Detroit, Michigan



Henderson De Luxe, $1785

—the Money in Selling Next Year's Cars

By C. P. Henderson

The chances are—if you sell moderate-priced cars—you've seen *next year's* models at the factories.

You know then that wire wheels, kerosene-burning cars, left drive, the new center seat control, cowl dash, cowl gasoline tanks, dust-proof en bloc motors, oversize cooling and, of course, electric self-cranking systems, electric lights are what *will sell* the leaders among 1914 automobiles.



But you are still selling 1913 models—and your prospects are holding off for 1914. *You can't take a profit on them now.*

But your overhead expense goes on, your most precious asset—time—slips by; some people buy other cars at discount—money is being eaten up—*yet the business pays no profit! At the heaviest buying season of the year.*

You Should Sell 1914 Cars Today

You ought to be offering prospects 1914 cars today!

That is the secret of making money—sell *next years* cars that people are *waiting* for—therein lies the *money.*

This is what Henderson dealers the country over are doing today. We've been shipping since May 20.

They offer a kerosene-burning car that solves the vital fuel problem; wire wheels are optional. The logical left drive combined with the convenient *new* center seat control; cowl gasoline tank, cowl dash, oversize cooling of the dust-proof en bloc motor; oversize tires and, of course, electric, self-cranking and electric lighting systems are the 1914 features you *could* offer today to your prospects who are *holding off.*

You *could* get this quick profit if you were a Henderson dealer, for they are getting it.

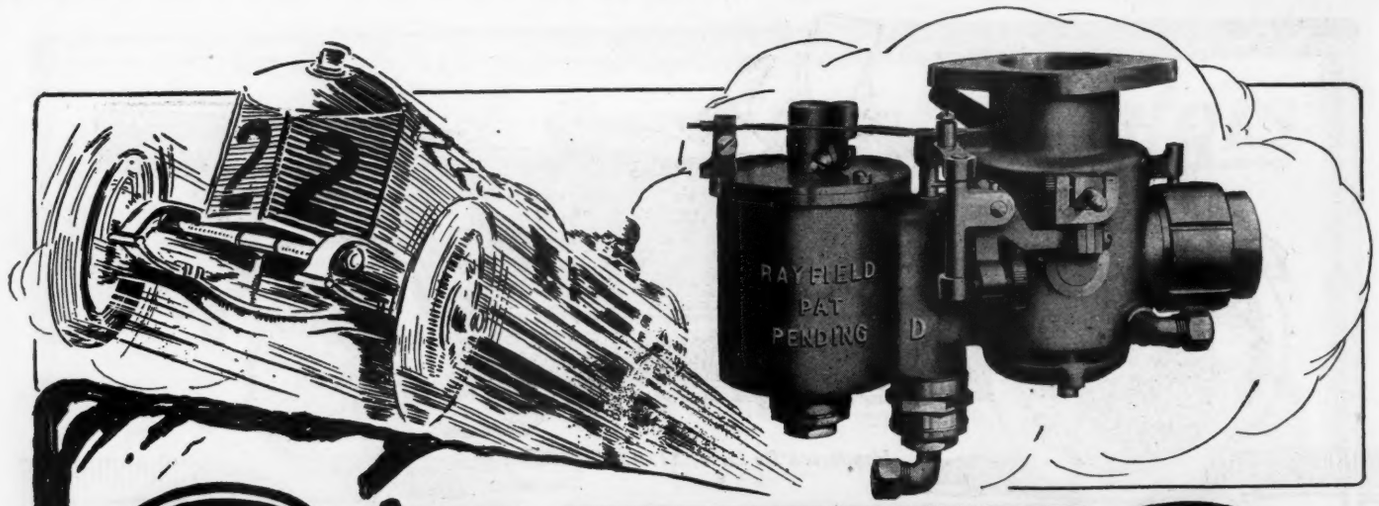
And, if you are the type of man we like, we would welcome a wire from you about territory—or you might write or come to the factory.

May we here from you quickly?

Henderson Motor Car Co., Indianapolis, Ind.

HENDERSON

46



RAYFIELD CARBURETOR

Supreme in the Fierce Test of Racing
Supreme in the Grind of All-around Service

The "SPEED KINGS"—all of them—KNOW that the RAYFIELD is the fastest carburetor on earth, because THEY USE IT AND WIN RACES and the Rayfield, **wins more races than all other carburetors combined.**

It isn't coincident nor an accident that causes the Rayfield—on any make of car, under all conditions, for every equipment—to consistently, unfailingly demonstrate **positive efficiency,—superiority.**

The man who designed it **knew** motor construction. **knew** the possibilities of gasoline combustion, knew the REQUIREMENTS of a carburetor better than anyone else did; and he finally produced a **perfect carburetor,**—the RAYFIELD—which gets the **maximum energy out of every atom of gasoline.**

That's **why** it wins races—or throttles down to a snail's pace without a skip.

By getting **all** of the power out of one drop of gasoline, it doesn't have to borrow any power from the second drop; that's why it pushes a car farther on one gallon of gasoline than other carburetors do, all of which means one thing — "More motor car service for less gasoline," and that spells **ECONOMY.**

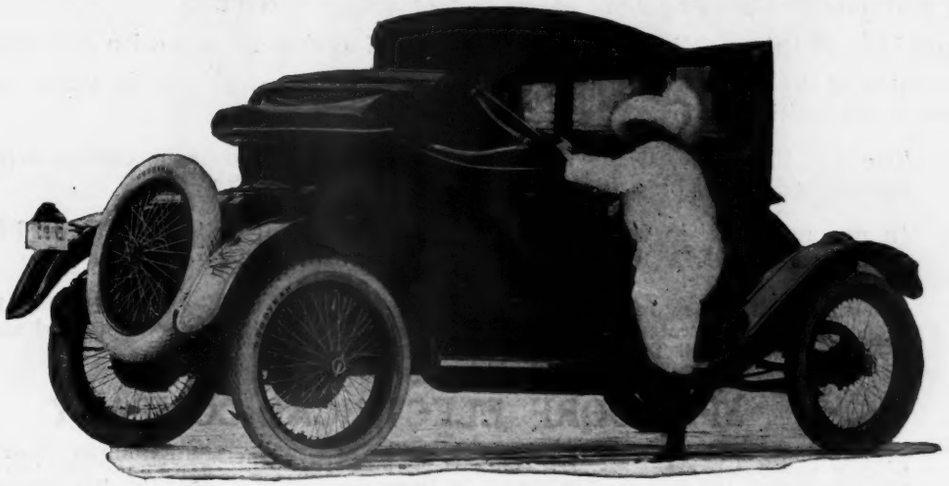
A thirty-day trial will convince you. It is yours for the asking.



Findeisen & Kropf Mfg. Co.
21st and Rockwell Streets
Chicago, Ill.

Branches — 1140 Michigan Ave., Chicago, Ill.; 1902 Broadway, New York, N. Y.; 997 Woodward Ave., Detroit, Mich.

McCUE WIRE WHEELS



You Should Be Willing To Cut Your Tire Expense In Two—Especially when it costs nothing to do it

Remember this—that while wire wheels actually increase the life of your tires 50% they cost no more than ordinary wooden wheels. It's simply a question of your insisting upon having wire wheels on your car. If you stand out for them you can rest assured that your dealer will see that they are furnished on your car.

There isn't one single reason why you shouldn't have McCue Wire Wheels on your car and there are at least a dozen reasons why you should drive a car so equipped.

Just the one fact that they practically double your tire life should be all compelling—but in addition there are the further facts that wire wheels make an easier riding car and one much easier to drive and handle. They lengthen the life of your car by absorbing road shocks and jars that rigid wooden wheels simply transmit to the mechanism of the car.

And there is nothing complicated or difficult to understand about the wire wheel. It accomplishes all these economies simply and easily. If you are interested and not convinced send for our booklet "Mileage Plus." It will explain the wire wheel story in detail.

The McCUE Company

Buffalo = = = = = = = = New York

SPLITDORF

"Always There"

Well done, is twice done

And every detail of SPLITDORF PLUGS is well done to the point of perfection.

The insulation of SPLITDORF PLUGS is high quality mica and designed and manufactured to absolutely withstand the breaking down effects of high tension current.

The design of the SPLITDORF central electrode is proof against all expansion and contraction.

The construction of the SPLITDORF shell allows small space for gas and its shape prevents all trouble due to pre-ignition on account of red-hot metal parts.



The SPLITDORF PLUG is less liable to short-circuit from carbon deposits than any other form of plug ever put out by any manufacturer.

In no one detail, in fact, where soot-proof, gas-proof and unbreakable PLUGS are concerned is SPLITDORF method not *twice done.*

Remember, All! "New Ignition for old" is our slogan—we have a SPECIAL EXCHANGE proposition of the greatest interest to every owner of a gasoline motor who would save time and money. Write or call TO-DAY for particulars.

SPLITDORF ELECTRICAL COMPANY

ATLANTA, 8 Harris St.
BOSTON, 180-182 Mass. Ave.
CHICAGO, 64-72 E. 14th St.
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 290 Halsey St.
NEW YORK, 18-20 West 63rd St.
PHILADELPHIA, 210-212 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
SEATTLE, 1628 Broadway.
LONDON BUENOS AIRES

FACTORY, NEWARK, N. J.

An initial investment of $500.00 puts the

Selden Truck



into service—and it will earn the balance of its cost within the year you have to pay for it.

In offering the Selden One-Ton Truck for $2000 on the

Time Payment Plan

we give all users an opportunity to prove the value of this efficient delivery method—To satisfy themselves that the Selden is in a class by itself — A thoroughly reliable truck which will do its work economically, day in and day out.

Our confidence in the Selden Truck could be shown in no better way than by the fact that we are ready to back it with the enormous financial resources which this time payment plan necessitates.

Valuable territory may be open for a reliable agent in your vicinity. It will pay you to write today telling us about your sale and service facilities.

Selden Truck Sales Company

259 East Avenue *Pioneers in Selling Trucks on Time* **Rochester, N. Y.**

VUL CANIZER REPAIR KIT—little brother of the SHALER



A Real Shaler Vulcanizer—$2

Don't ever use another makeshift cemented patch. Make permanent repairs anywhere with the quick-cure Vul-Kit. It is the only satisfactory inexpensive vulcanizer ever made. Mends tube punctures as well as the most elaborate plant. Makes your repairs when you want them at one-tenth of the usual cost.

Note these Original, Exclusive Features

These advantages, which are found only in the Shaler, make it safe and simple enough for anybody to use. You can make a perfect repair the **first time.**

Cleanliness The Vul-Kit is designed to burn **alcohol** so that it can be used indoors without covering things with soot. Gasoline can be used for roadside repairs if desired.

Safety The fuel is contained in a reservoir, not an open cup, so that it is impossible to spill burning liquid on your tire.

Perfection A generator transforms the fuel into gas and burns it slowly so that the vulcanizing temperature is maintained long enough to cure the repair clear through.

The handle enables you to remove the vulcanizer from the tire as soon as the repair is cured.

The clamp insures smooth repairs by making it impossible to squeeze one side of the tire tighter than the other. An asbestos pad is inlaid in the tube shelf to bring the pressure on the repair instead of on the edges of the tube.

The Vul-Kit is fully nickeled. Comes to you complete with repair material and instructions. **Price**.....**$2.00**

C. A. SHALER CO., 228 Fourth St., Waupun, Wis.



Concrete—the Least Expensive Permanent Road Material

It forms the foundation for all good roads whatever the surface may be. A concrete road is free from dust, hard as the rock from which it is made, perfectly smooth and clean.

Macadam

is out of the question under present day traffic conditions. It won't stand the grinding and suction. It goes to pieces under automobile travel.

If you are interested in your County or State, write us for specific information about concrete; the facts will speak for themselves.

Our free booklets on the use of concrete in road construction may be had for the asking.

Universal Portland Cement Co.
Chicago — Pittsburgh — Minneapolis
PLANTS AT CHICAGO AND PITTSBURGH
ANNUAL OUTPUT 12,000,000 BARRELS

"Soot-Proof" Spark Plugs Never Balk—Over 2,000,000 Prove It



Not all spark plugs will carbonize.
Not all get dirty, grow weak or short circuit.
And not all spark plugs call for frequent replacement.

Mr. C. A. Mezger—after twelve years spent on spark plug problems—has perfected and patented the "Soot-Proof" plug.

This plug is warranted to clean itself. It never clogs, never leaks, never short-circuits. And it lasts for years.

Its use forever ends all spark plug worries.

It is built with a double chamber. Thus it offers at least three times the resistance of any other spark plug made.

It outlasts any other by two or three times over.

This has all been proved to hundreds of thousands. For over two million "Soot-Proof" plugs are now in use on the leading cars of America.

One "Soot-Proof" plug will prove this to you If you have any doubt, use old-type plugs with it. Note the difference in results

Do this now. Think what it means to have spark plug troubles forever wiped out. This spark plug will do it—that is guaranteed.

Get them from your dealer. If he can't supply, find a dealer who can. Or send to us direct. In replacements alone these "Soot-Proof" plugs will save many times what they cost you.

C. A. Mezger "Soot-Proof" Spark Plugs

C. A. MEZGER, Inc., 15 Canal Place, New York

Philadelphia, 1427 Vine St., Petry-Cassidy, Inc.
Chicago, 1430 Michigan Boulevard, F. E. Sparks
Detroit, Ford Building, H. E. Butcher
Portland, 329 Ankeny St., Hughson & Merton
Seattle, 924 E. Pike St., Hughson & Merton
Los Angeles, 1229 So. Olive St., Hughson & Merton
San Francisco, 530 Golden Gate Ave., Hughson & Merton

A SEVENTH REASON WHY

Practically All the Leading Car Builders are Large Users of

GABRIEL

Rebound Snubbers

(Standard Equipment on the Easiest Riding Cars
PEERLESS STEARNS WHITE)



Easy to put on. No drilling or otherwise marring the car. Noiseless at all times. No further adjustment required and will outlast the car.

Always 100% Efficient—Once on the car, Gabriels require no readjusting or other attention. There is nothing to get out of order, wear down, work loose or rattle. You forget you have Gabriels, just as you forget the jolts and jars you used to have without them.

Stop and realize the easy-riding, the thousands of miles extra service, the freedom from repairs, reduced up-keep on car and tires—and you will realize the selling advantages Gabriels add to any car.

Treat yourself to a Demonstration. Let us send you catalog and name of our nearest dealer

GABRIEL HORN MFG. CO., 1415 E. 40th ST., CLEVELAND, O.

Makers of the famous GABRIEL Musical Horns and Auto Accessories


PLANT No.1. BERLIN, GERMANY.

BALL ~ BEARINGS

HB DWF



The Hess-Bright Manufacturing Company

Pioneers in the introduction of Annular Ball Bearings

Most extensive resources and plants in existence devoted exclusively to ball bearing manufacture. Enlarging and improving facilities, product and capacity for distribution.



Main Offices and Plant No. 2 on line of Penna. R. R. to New York
No. 9 E. Erie Ave., Philadelphia, Pa.

Stores for Retail Distribution:

PHILADELPHIA	NEW YORK	CHICAGO
666 North Broad Street	1974 Broadway	1800 Michigan Avenue


PLANT No.2. PHILADELPHIA, PENNA.

The Guarantee
Behind Every Jones Speedometer

The guarantee behind every Jones Instrument is simply, SATISFACTION. That covers every part of the instrument. And back of this guarantee stands Jones Branch Houses and Agencies in all of the principal cities of the world.

Able Men in Charge

These branches and agencies are managed by men who have had a wide experience. They are experts——men of education. And they have the finest speedometer built—to make this cycle of service complete.

The New Jones is the simplest speed indicator. It has the fewest parts. We grind every part where exactness is needed to the one ten-thousandth part of an inch.



The New York Service Station

13-year-old Jones are as accurate now as the day they were placed on their first motor cars. Many today are on their fifth and sixth cars, giving perfect service.

Motorists Want "Year 'Round" Speedometers

Men are now driving their cars the year round instead of merely in Spring and Summer. They want a speedometer that shows **absolute accuracy at all speeds, at all times, regardless of temperature.** This is a **feature** of the Jones.



Model 175—Price, **$125**

Let Us Send This Man

There's a man in our factory who has every Jones detail at his finger tips. He can answer your every question and give you every fact. In sending for the Jones books and naming a date convenient to you on which you can talk with this representative you are obligating yourself none whatever.



Model 60—Price, **$60**

The Jones Speedometer, Broadway at 76th Street, **New York City**

Branches New York, Broadway at 76th St.; Boston, 109 Massachusetts Av.; Philadelphia, 1427 Vine St.; Chicago, 1430 Michigan Av.; Baltimore, 217 W. Saratoga St.; Detroit, 872 Woodward Av.; Buffalo, 20 Goodrich St.; Pittsburgh, 5904 Penn Av.; Cleveland, 1845 Euclid Av.; Charlotte, 209 Church St.; Memphis, Madison Av. and Fourth St.; Minneapolis, 800 Hennepin Av.; Omaha, 1608 Harney St.; San Francisco, 1436 Van Ness Av.; Los Angeles, 408 W. Pico St.; Portland, Ore., 71 Seventh St.; Seattle, 1710 Broadway; Indianapolis, 1201 State Life Bldg.; Atlanta, 35 N. Pryor St.; New Orleans, Barrone and Perdido Sts.; Birmingham, 18 S. 20th St.; Denver, 1600 Broadway; Newark, N. J., 283 Halsey St.; Albany, N. Y., 133 Hudson Ave.

Foreign Agencies J. Millen & Son, Ltd., Montreal, Toronto, Winnipeg, Vancouver; Markt & Co. (London), Ltd., London; Markt & Co., Hamburg, Milan, Vienna, Barcelona; A. A. Kampfraath (Brussels), Ltd., Brussels, Amsterdam; Severin & Co., St. Petersburg; G. Bruggemann, Moscow; Y. D. Rose, Paris; William D. Easy & Co., Sydney, Australia; The Tarrant Motor Co., Melbourne, Australia; C. E. Helvie, Manila, P. I.; Adams, Ltd., Christchurch, New Zealand; Markt & Schaefer Co., Rio de Janeiro, Brazil; Buenos Aires, Argentine; Mexico City, Mex.; Habana, Cuba; San Juan, P. R.

The (Always Accurate) Jones Speedometer

THE FEDERATION OF TRADE PRESS ASSOCIATIONS IN THE UNITED STATES

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the United States at the Hotel Astor, New York, Sept. 18, 19, 20, 1913.

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

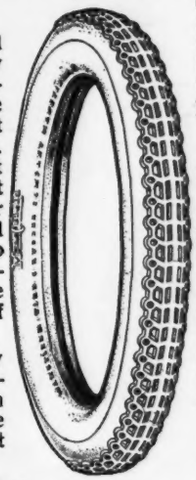
Wm. H .Ukers, Chairman, 79 Wall St., New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago

Cable-Structur Tires—& Why

Dealers, your business success depends upon your service to customers, doesn't it? The merchandise you sell must give satisfaction or you lose trade. That law holds true in all lines. You can't afford to sell any tire but the BEST. Mansfield Cable-Structur is that tire. Here are the reasons WHY it is best and WHY YOU SHOULD SELL CABLE-STRUCTUR:



Unlimited in Quality

First we build unlimited quality into Cable-Structur tires. We use only the highest quality materials. Only fabric that will test at least 325 pounds per square inch, and this fabric is so woven as to permit of complete impregnation of new rubber.

And we use only the finest new rubber. This is given greatest endurance by our secret formula.

Unbreakable Base

24 endless, no-stretch steel wires, 12 on each side, are vulcanized into the semi-hard rubber beads. This gives the most logical tire base—and absolute safety.

These 24 wires give a tensile strength of 16,800 pounds.

Saving Rim-Ruin

This basal construction makes a hooked base unnecessary. So the flange hooks are turned from the tire. Therefore no rim-damage is done if the tire is run soft, from any cause.

More Carrying Power

This compact Cable-Structur base gives greater air space. That gives the tire greater carrying power, that saves blow-outs, and their costs.

Careful Hand Building

Our careful hand building insures utmost exactness. Every inch of fabric is applied with unvarying precision. That means uniform strength.

Built Slowly

Cable-Structur tires are built very slowly. It costs us more—cuts our profit, but it insures perfect, flawless tires, and cuts the users' cost.

Experts Paid By Hour

Only expert tire men—men of long experience—build Cable-Structur tires. To avoid all rushing or slighting of work we pay our men by the hour, at highest wages.

So you see there is nothing uncertain about Cable-Structur.

No-Skid Tread

The No-Skid Tread is doubly effective—it has scores of high projections to grip the road, and scores of vacuums to hold on smooth pavements. And below the no-skid tread is a thick plain tread to add great mileage. Both are very tough, and wear resisting. The two give great mileage.

Tested 30,000 Times

More than 30,000 have been tested by motorists, and now the demand calls for our utmost capacity.

The replacement of Cable-Structur tires is but six-tenths of one percent, with our rigid 3,500 mile guarantee.

The average mileage of a large percent is between 7,000 and 12,000 miles.

Can you ask more evidence?

Control the Sale

Place your order now, corral the demand for this tire, and you can control the sale.

We'll stay with you. We'll help you sell Cable-Structur Tires. Write today for our special proposition (106).

Mansfield CABLE-STRUCTUR

The Mansfield Tire & Rubber Co., Mansfield, O.

ALL-IN-ONE SPARK PLUGS

Add Life To Your Motor

Clean it after every run while still hot by injecting a few drops of kerosene into it through the petcocks of your ALL-IN-ONE SPARK PLUGS. Let the kerosene work over night.

In the morning start the motor, open the petcocks one at a time, and all carbon, soot and gummy deposits will be blown out. Your motor will be practically as fresh and eager as it was the day it left the factory. Make cleaning your motor in this way a habit.

ALL-IN-ONE PLUGS cost no more than the other kind.

Price, **$1.25** Each



Frontier Specialty Company

Buffalo, N. Y.

Patented



Basline Autowline

Trade Mark Registered

WEIGHS FIVE POUNDS TOWS 6000-POUND CAR

Tuck a Basline Autowline under an auto cushion and be prepared. Takes up no room; is clean, neat, compact. Made out of World Famous Yellow Strand wire rope—the record rope on the Panama Canal—built the Woolworth building, and is used by all big contractors. You can attach

BASLINE AUTOWLINE

for use in a minute and get out of any road difficulty in a jiffy. Read this user's evidence:

Near Princeton, N. J., I saw three automobiles in trouble. One, a seven-passenger car, was up to its hubs in a ditch. The other two were lighter cars. With my Basline Autowline I pulled all three out without any trouble. All were enthusiastic about your Autowline. No touring car should be without one, as you supply it in such a compact manner.
J. NOAH H. SLEE, New York.

FREE Send today for the fully illustrated Autowline Circular. It's free. Basline Autowline is sold by every good Supply Dealer for $3.75.

The Little Steel Rope with the Big Pull

Broderick & Bascom Rope Co. 813 N. Second S. ST. LOUIS, MO.
NEW YORK OFFICE, 75 E. Warren St.
Sole manufacturers of world-famous Yellow Strand Wire Rope

MAYO SPARK PLUG PUMP

$10 Substitute for any spark-plug. The motor does the work, fills the largest tire with pure, fresh air in from 2 to 3 minutes. Built with metal rings like a motor and will last as long. Adaptable to all size cars from the smallest Ford to the largest Lozier. Weight, 2½ lbs. Complete with 12 ft. of hose and connections. Price, $10.00. With pressure gauge, $2.00 extra.



Mayo Mfg. Co.
55 East 18th Street
CHICAGO, ILL.



Try It FREE on Your Car For 30 Days

Write Us



MONDEX

Auto Devices

Lead the World for Efficiency and Economy

At Dealers Everywhere

MONDEX-HELIX GAS SAVER

Reduces Your Gasoline Bills 25 to 40 Per Cent

Price, All Sizes, $5.00

MONDEX SHOCK PREVENTERS

Reduce Your Repair Bills 100 Per Cent

Saves wear and tear of tires and eliminates all vibration

Motor Car Racing says: "Mondex Shock Preventers proved they are right in the highest court of mechanical test known." **Write for Booklet "N."**

Agents Wanted Everywhere



The Aristos Company
250 West 54th St., New York

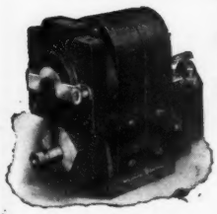
Every drop of Gasolene is lost that fails to generate power in your car.

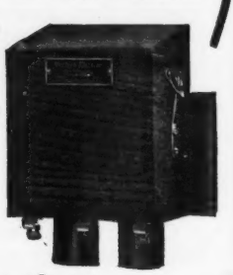
With

Western Electric
PITTSFIELD

IGNITION APPARATUS

You get all the power all the time from the Gasolene in your cylinder.





Write our nearest houe about Everything Electrical for Automobiles

Western Electric Company
Offices in New York, Chicago and all Principal Cities

FORD OWNERS!

Light Up While You Motor with a

Presto Ford Cigar Lighter



When you want to smoke simply press the stem, and "Presto!" you have a light, going at any speed. No stopping to light up. Absolutely safe, all metal parts thoroughly insulated. Does away with matches and all danger from fire. Especially designed for FORD Cars. Gets its power direct from the magneto. Fitted with platinum lighter tip especially suited to FORD magneto. Looks like a watch. An ornament to any car. Case is of polished wood, ebony finish. All metal parts heavily nickel plated. Complete with 10 ft. silk cord, and holder which can be placed in any part of car. Price, each,

$2.50

"PRESTO" Ford Cigar Lighter, complete with Holder, $2.50

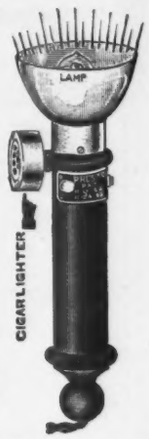
The same design of a cigar lighter, watch shape, is also made for all other makes of cars. When ordering, specify Presto Star. Price.....$2.50

Jobbers and Dealers — Get Busy!!

"Presto" 3 in 1 { Cigar Lighter / Repair Lamp / Lamp Lighter

Just press the button and light your cigar going at any speed, or you can use it to light your acetylene lamps in the strongest wind. No more striking matches. Also a handy exploring lamp with nickel plated reflector. Always at your elbow, within easy reach. Is 6-volt electric. Complete with 10 ft. silk cord. Price, each..... $3.50
Highly polished holder for dash attachment, 25c extra

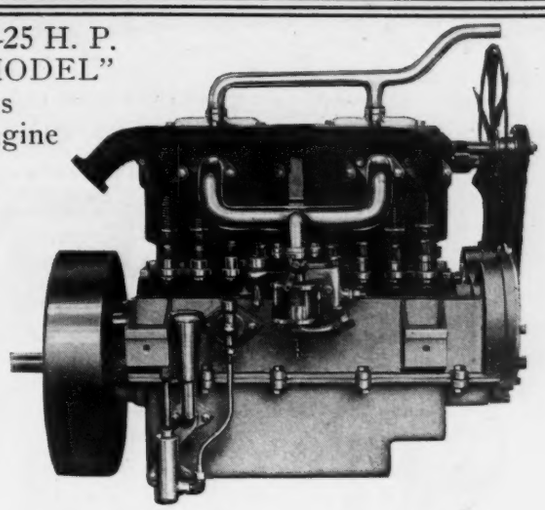
At all dealers, or sent prepaid on receipt of price



METAL SPECIALTIES MFG. CO.
736-738 W. Monroe St. Chicago, Ill.

"PRESTO" 3 in 1 Price $3.50

22-25 H. P. "MODEL" Gas Engine



Model Gas Engines

We offer for 1914 a complete line of 4 and 6-cylinder pleasure car and truck motors, to be had as unit power plants, or without transmission, clutch and control.

Compactness, simplicity and durability are 3 cardinal points in their design.

Send us your specifications before you determine upon a power plant for 1914. Write for full details and prices.

We are specialists in building heavy-duty motors intended for tractor work.

Model Gas Engine Works

PERU, INDIANA

$100,000,000 in Tires Thrown Away Every Year

This Free Book Tells the Story

There were about 990,000 automobiles running in this country last year. The tire expense per automobile amounted at the very least to $50 a year.

Covered with Durable Treads, those tires could have been made to run two or three seasons, *instead of one!* They could have been made to run 10,000 miles *at the least,* instead of 5,000 miles at the most!

And conservative estimates prove that that would have meant from $50,000,000 to $100,000,000 in tires saved from the scrapheap last year—skidding positively prevented, the best possible protection provided against blow-outs, *and an ironclad 5,000-mile guarantee against puncture given.* Think of it.

Send for the book, "10,000 Miles on One Set of Tires." The facts outlined in this book are creating a veritable sensation in the whole automobile world. It shows just why over 20,000 American motorists already equip their tires with these Treads, why half the motorists in France and Germany use protectors made on their principle, why our sales increased 917% in one year, and are continuing to increase at the rate of eighty a day, for every single day in the year.

This book has been called—by men who are tire experts—the most important communication ever addressed to the motorists of this country on the subject of tires and tire economy.

Send for your copy right now. It may be the means of adding 5000 miles more service to the tires now on your car. Tear out this advertisement—now—before you turn the page—to remind you surely to send for it.

The Colorado Tire & Leather Co.

1327 Acoma Street, Denver **450 Golden Gate Ave., San Francisco**
1111 Karpen Bldg., Chicago **482 Fourth Ave., New York**

WHEN YOU BUY AN AUTO TRUNK



Look for the Red "K" and Gold "Diamond on the Front

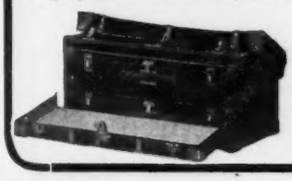
The red and gold trade-mark shows that it's a genuine Kamlee—the handsomest, strongest, most convenient auto trunk ever made.

Light and flexible, yet tough and durable in the extreme, it fulfills every requirement of the touring motorist. New air-tight interlocking edge makes

THE NEW KAMLEE

The Only Really Dust-Proof and Rain-Proof Auto Trunk

on the market. The edges lock together—rain or dust cannot enter anywhere. A rubber tubing at bottom of interlocking groove conforms to any irregularity or give in top and front. Contents thoroughly protected in any weather. Waterproof covering is fastened over top with patent spring-swivel nuts. No straps to bother with in opening. See it at your dealer's or write us for prices and descriptive booklet. We'll gladly send you a Kamlee on approval anywhere if your dealer can't supply you.

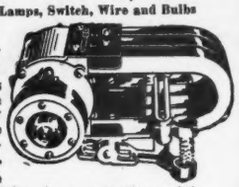


THE KAMLEE COMPANY
234 Broadway Milwaukee, Wis.

Improve the appearance and efficiency of your car by installing the

K-W Electric Headlight Outfit, $40

Complete Outfit: Generator, Head Lamps, Switch, Wire and Bulbs



Easy to install on any car having exposed flywheel or other place to drive the Generator.

Light Weight Generator weighs but 18 lbs. Compare it to the heavy complicated and costly charging outfits. It you have the Electric Head Lamps, get the K-W Electric Generator only $25.

Can be used for Ignition in connection with Timer and Spark Coil.



Handsome made-for-the-purpose head lamps

No extra charge for black finish. The reflectors are set in the door against a felt ring to keep out dust and moisture. They are made of correctly formed brass heavily silvered and highly polished on the reflecting surface. Lamps alone, $15 and $17.

K-W Ford Electric Headlight Outfit, $15

FOR FORD CARS WITH FLYWHEEL MAGNETO

The successor to the gas tank. The most successful electric headlight outfit for Ford cars, because it is especially designed and engineered to work in connection with the Ford Flywheel Magneto.

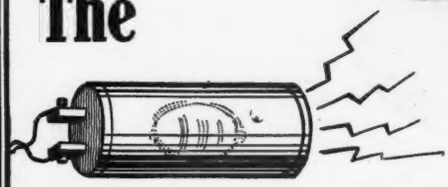
Send for descriptive folder

THE K-W IGNITION Co
2835 Chester Avenue CLEVELAND, OHIO. U.S.A.

We also make the famous K-W Master Vibrator
The Standard by Which All Others Are Judged

You Can't Shock The





CORBIN-BROWN SPEEDOMETER

"The Speedometer of Absolute Accuracy"

into inaccuracy because it's built on the centrifugal principle—not magnetic.

Write today for catalog

(The American Hardware Corporation)

The Corbin Screw Division

209 High Street, New Britain, Conn.

Branches: NEW YORK, CHICAGO, PHILADELPHIA

Makers of the celebrated Corbin Coaster Brake for Bicycles and Motorcycles

BALDWIN Chains and Sprockets



run well together; made in a completely equipped plant with an organization skilled in the art by long experience. Manufacturers should have samples and prices of our chains, and allow us to quote on their blue prints for sprockets before placing their 1913 orders. We are prepared to furnish sprockets for replacements for all standard and commercial cars.



H. V. GREENWOOD, 122 So. Michigan Blvd., Chicago, Ill. C. J. IVEN, Rochester, N. Y. M. A. BRYTE, 788 Mission St., San Francisco, Cal. C. D. SCHMIDT, 416 Broadway, New York City. F. SHIRLEY BOYD, 893 Boylston Street, Boston, Mass. AUTO EQUIPMENT CO., Denver, Colo.

Motor Ignition Appliances

A Practical Treatise

on the Application of Electricity in the production of the Ignition Spark in Petrol Motors

By T. H. HAWLEY

Author of

"Motors in Principle and Practice," "Petrol Motors Simply Explained," etc.

CONTENTS

I. Introduction.
II. Outlines of Electric Ignition.
III. A Brief Explanation of Some Electrical Terms Commonly Used.
IV. An Outline of the Methods by Which the Desired Mixture is Attained and the Spark Produced.
V. Some Methods of Wiring up the Electrical Circuit.
VI. Accumulator Construction.
VII. The Accumulator—Discharging or in Use.
VIII. Accumulator Charging.
IX. Accumulator Charging Boards and Methods of Connecting Up.
X. Sparking Plug Construction.
XI. The Induction Coil.
XII. The Contact Breaker and Advance Spark Mechanism.
XIII. Trembler Coils and the Auto Trembler.
XIV. Magnets and the Magnetic Field, Lines of Force, Etc.
XV. The Magneto and the Electro Dynamo.
XVI. The Low and High Tension Magneto Systems.
XVII. Other Variations of Ignition Systems.
XVIII. Resistance.
XIX. Testing for Faults.
XX. Accumulator Repairs.
XXI. Testing Instruments and Their Use.
XXII. The Mounting and Fixing of Ignition Apparatus.
XXIII. The Switch: Various Systems Explained.
XXIV. Conductors and Connections.
XXV. Spark Distribution in Multi-Cylinder Engines.
XXVI. Ignition, Manipulation and Starting on the Switch.
XXVII. General Hints on Methods and Appliances.

Fully illustrated. Size 5½x8½ inches. Price, postpaid..... $1.50

The Class Journal Co., 910 S. Michigan Ave., Chicago, Ill.

CONNECTICUT

MASTER VIBRATOR For *Ford* Cars



Draws Minimum Current From Magneto

Owing to its high efficiency and skillful design, the Connecticut Master Vibrator draws a minimum amount of current from the magneto. It gives perfect synchronism with an exceedingly hot spark.

For over a year the Connecticut Master Vibrator has passed the most severe tests. On one car it went 18,000 miles without the contact points being renewed and with only three adjustments. It is small, neat and easy to install.

Price $9.00. At your regular dealers or direct from us, all charges prepaid.

Write for descriptive Circular No. 36

Connecticut Tel. & Electric Co., Inc.
Meriden, Conn.

Chicago.....1463 Michigan Ave. Boston.....224 Pleasant St.
Philadelphia.....1414 Race St. Los Angeles.....1229 So. Olive St.
San Francisco, 530 Golden Gate Ave. Portland.....329 Ankeny St.
Seattle.....924 E. Pike St. Denver.....1528 Broadway
Pueblo

Veeder

"Near Enough"—

won't do, if you want to know the ***exact cost*** of upkeep of pleasure or commercial vehicle. Mileage must be correct to a fraction if you are interested in tire, gasoline or "juice" and lubricating consumption. Exact mileage is only obtainable with a VEEDER HUB ODOMETER — which ***can't be tampered with.***



Neat, durable and compact, it can be easy attached. Price complete, **$25.00**

At your dealer's direct from our factory or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings



Solar system of auto necessities. Solar plexis to auto perplexities.

Carried and recommended by every well equipped garage and supply house.

SE-MENT-OL-Self acting radiator cement.
CARBONOX-Quick & efficient carbon remover.
NEVER-RUST-Chemically correct rim paint.
BRASS-KOTE-Air drying brass enamel.
TIRE-LAC-Chemically correct tire paint.

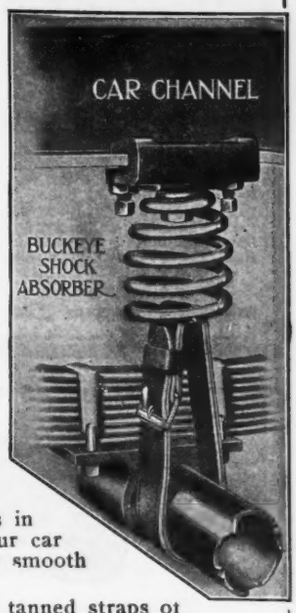


When you see that sign, buy the whole line.

THE NORTHWESTERN CHEMICAL Co.
Marietta, Ohio.

"Buckeye Shock Absorbers"

Guarantee Easy Riding on the Roughest of Roads



Allows downward motion of springs to act naturally, thus giving full spring resiliency on the smooth road.

Absolutely prevents broken springs, the absorbers taking the shock when springs rise above their neutral position.

$5.00 per pair

Specify on order when wanted for cars of over 4000 lbs. in weight.

The "Buckeye Shock Absorbers"

will soon pay for themselves in saving on the up-keep of your car alone, besides the absolutely smooth riding that they insure.

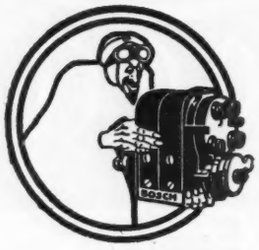
Springs full oil tempered and tanned straps of genuine California Latigo stock. Attached in a few minutes—no holes to drill.

Carried in stock by jobbers in all principal cities or sent direct on receipt of price. Weight, 5½ lbs. per pair.

MANUFACTURED BY

The Central Brass & Fixture Co., Springfield, O.

CANADIAN DISTRIBUTORS:
JOHN MILLEN & SON, Montreal, Winnipeg, Toronto, Vancouver



You Should Have The Leading System

BOSCH Magnetos were used by the winner of the Los Angeles-Stockton Road Race, the Tacoma 600 cu. in. and the Free for All Road Races of course.

Be Satisfied **Specify Bosch**

Literature sent on request

BOSCH MAGNETO COMPANY
214 West 46th Street **New York**



The Vain Crow

commanded no respect with her borrowed feathers

AN automobile oil to be really good must not only look good but must have the vital heat-resisting properties and freedom from carbon. The only really *perfect* auto oil is made in limited quantities from a certain select Pennsylvania crude.

We control over half the available supply of this product. We sell it at ordinary "good oil" prices as

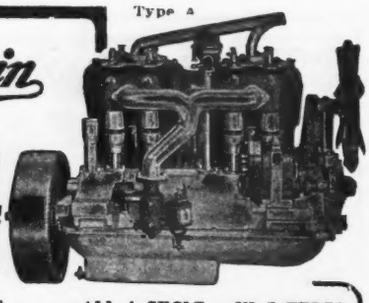
"Autlubo, That Good Oil"

Our book on Automobile Lubrication tells all about it. A postal will bring it.

THE MOORE OIL COMPANY
Logansport, Ind. CINCINNATI Columbus, Ohio

Wisconsin Motors

Type A



Real masterpieces of engineering skill. Note their special features — examine their perfect construction.

Large Bearings	Large Valves
Perfect Lubrication	Ample Water Jacket
Double Ignition	Perfect Workmanship
Heavy Crank Shaft	Long Stroke

Write us and we will tell you where a Wisconsin Motor may be seen.

ALL 4 CYCLE — IN 5 TYPES

3⅜ inch bore, 5	inch stroke, 4 cylinder
4¼ inch bore, 5	inch stroke, 4 cylinder
4½ inch bore, 5	inch stroke, 6 cylinder
4⅝ inch bore, 5½	inch stroke, 4 cylinder
5¼ inch bore, 7	inch stroke, 4 cylinder

WISCONSIN MOTOR MFG. CO., Dept. 25, Milwaukee, Wis.

Dorris

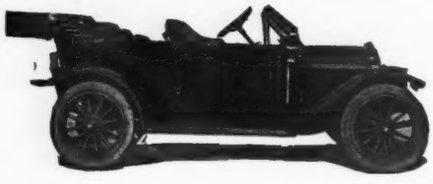
Built to Last



THE SILENT CAR
BUILT TO LAST

Our agency proposition will interest you. Write for it.

DORRIS MOTOR CAR COMPANY
100 S. Sarah Street **St. Louis, Mo.**



Marathon Automobiles

America's most comprehensive line. Every car completely equipped. 3 sizes chassis—10 body styles. Price range from $875 to $1800

Write for Catalogue M-A

MARATHON MOTOR WORKS, Nashville Tenn.

Hupmobile

"32" Touring Car	$1,000
"32" 6-Passenger Touring Car	1,200
"32" Roadster	1,000
"32" Covered Delivery	1,075
"20" Runabout	750

All models F. O. B. Detroit. Fully equipped
Literature sent upon request

HUPP MOTOR CAR COMPANY
1228 Milwaukee Avenue Detroit, Michigan

U-S-L  U-S-L

Takes the place of the Fly-wheel

The U-S-L Electric Starter and Lighter is a combination motor and generator that takes the place of the fly-wheel. The armature of the motor-generator is bolted directly to the engine crank-shaft.

The U-S-L doesn't add a single extra moving part to a car.

No gears or chains — **No extra clutches**
No added weight — **Starts at a push of foot-button**
No bearings to oil — **Supplies ample current**

Adopted by
Rambler, Overland, Garford,
Edwards-Knight, Moyer, S. G. V.

Write for Bulletin 501

The U. S. Light & Heating Co.

General Offices: 30 Church St., New York

Branch Offices and Service Stations—New York, Boston, Buffalo, Cleveland, Detroit, Chicago, St. Louis, San Francisco.

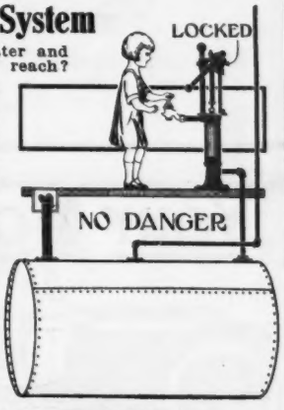


A DANGEROUS PLAYTHING FOR YOUR CHILDREN

Why Gasolene is Dangerous Around Home

"Gasolene evaporates rapidly and the gas it makes is seven times more dangerous than gun powder. A single spark would cause a frightful explosion." (Extract taken from "Individual Fire Fighting," published by the Rochester (N. Y.) Chamber of Commerce.) Is this volatile, elusive liquid a safe plaything for your or your neighbor's child? Then why store it above ground? Why not put it away in a

Bowser Safe Oil Storage System



where it is as safe to handle as water and out of innocent children's curious reach? These outfits are built to conform to that measure of safety prescribed by the National Board of Fire Underwriters and their Laboratory is so labeling them. Is it any wonder that out of the

MILLION SATISFIED USERS

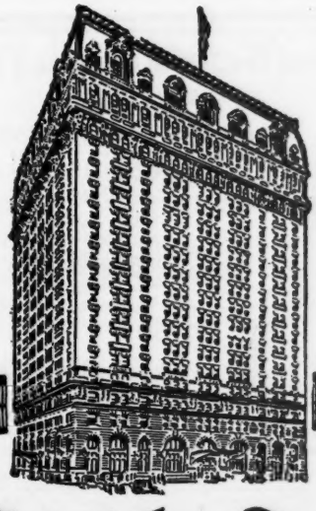
all over the world there has never been a fire traced directly or indirectly to their use? Isn't this better than an insurance policy? It is a fire preventative and you pay the premium but once.

Write for our handsomely illustrated book, "At the Sign of the Red Sentry." Mailed free upon request. It will give you details on oil storage that are well worth your reading.



S. F. BOWSER & CO., Inc.
Home Plant and General Offices
Box 2126, FT. WAYNE, IND., U. S. A.
Sales Offices in all Centers and Representatives Everywhere

Original patentees and manufacturers of standard, self-measuring, hand and power driven pumps, large and small tanks, gasolene and oil storage and distributing systems, self-registering pipe line measures, oil filtering and circulating systems, dry cleaners' systems, etc. **Established 1885**



Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

RATES

ONE PERSON	Room with detached bath	$2 to $3 per day
	Room with private bath	$3 to $5 per day
TWO PERSONS	Room with detached bath	$3 to $5 per day
	Room with private bath	$5 to $8 per day

TWO CONNECTING ROOMS WITH BATH

Two persons	$5 to $ 8 per day
Four persons	$8 to $15 per day
SUITES	$10 to $35 per day

LA SALLE AT MADISON STREET, CHICAGO

Starts — Lights — Ignites

REMY

Six Volt System-Does-It-All

THERE is only one real way to provide for the efficient starting, lighting and ignition of your car.

Have one manufacturer design and build all three systems; have this one manufacturer responsible for all three.

We are the only concern building the complete apparatus—either as a whole or in any combination—starting—lighting equipment—magneto, or battery ignition (generator and storage battery). The starting and lighting equipment is sold only to automobile manufacturers.

Write for our magneto exchange offer.

Remy Electric Company

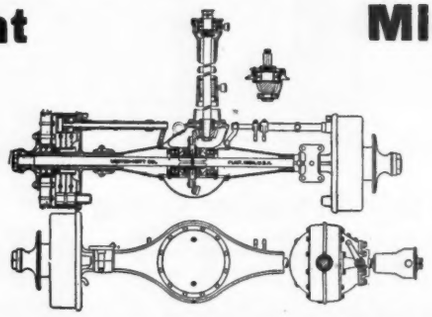
General Offices and Works, Anderson, Indiana

BRANCHES:
New York Detroit Kansas City Minneapolis
Boston Chicago San Francisco

(Service stations throughout the country)

Weston-Mott Axles

Flint **Mich.**



HESS AXLES

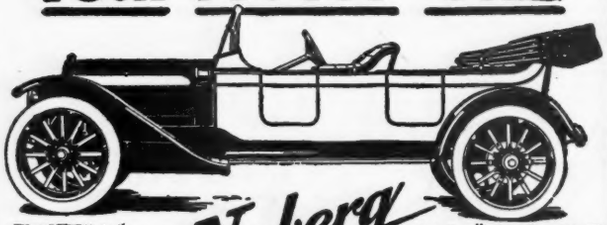
¶ HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

¶ Renewals of HESS contracts for 1913 from past users and an increasing HESS demand among new manufacturers, is ample proof of the stability of HESS Quality.

¶ May we be of service to you? Write us.

THE HESS SPRING & AXLE COMPANY
Carthage, Ohio, U. S. A.

Your Motor Car!



Electric Starter
Electric Lights
Center Control
Complete Equipment

Nyberg SIX $2000
FOUR $1650

NYBERG AUTOMOBILE WORKS

Northern Factory Anderson, Indiana — Chicago Branch 2437-2439 Michigan Ave. — Southern Factory Chattanooga, Tenn.

Simplicity, Strength, Durability—

COVERT

Three important points in

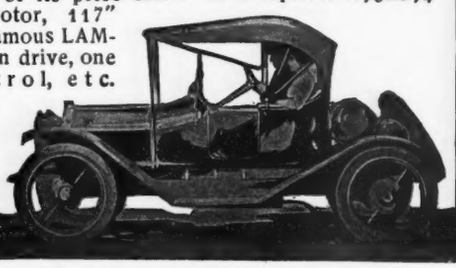
Covert Transmissions

You would not think of putting an inferior motor in your car, would you? Superior transmissions are essential as the best motors.

COVERT MOTOR VEHICLE CO.
Sales Office: Ford Building, Detroit
Factory: Lockport, N. Y.

The LAMBERT

The LAMBERT Model 99 (5-passenger touring car or 2-passenger roadster) at $1365 (fully equipped) stands at the head of its price class. It comprises 4⅛x5¼ Rutenber motor, 117" wheelbase, famous LAMBERT friction drive, one lever control, etc. Write for catalog.



BUCKEYE MFG. CO.
ANDERSON, IND.

Pendleton Gear-Locking Device

FOR ALL AUTOMOBILES



A Perfect Preventative Against Theft

Absolutely guaranteed against filing, sawing or cutting in any manner while attached to the car

In ordering state make, year and model of car

$1.50 Delivered to any part of U. S. without padlock.

HALLIWELL CO.
Sales Agents
408 W. Pico St., Los Angeles, Cal.

PATHFINDER

WORTHY OF THE NAME

THE PATHFINDER car is an unusual combination of mechanical virtues. Each detail is standard in design, workmanship, and quality materials.

The Pathfinder chassis is a composite of the best proven ideas in European and American practice — built to withstand rough usage and to remain quiet even in "old age." The Pathfinder "selling plan" is one you will be glad to know about. It is unique and comes to you in the form of the "101 Reasons," a short, concise course in Pathfinder salesmanship. Yes, it is absolutely different—better write today, NOW!

Just ask for—
"Photo Story of a Pathfinder"
"100 and 1 Reasons"

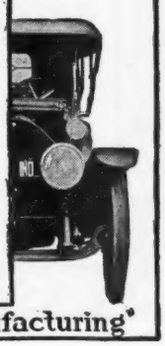
THE MOTOR CAR MFG. CO.
Indianapolis, U. S. A.

MARMON

"The Easiest Riding Car in The World"

Marmon "32"
Four cylinders, 32-40 h. p., 120-inch wheelbase, electric starting and lighting system, left-hand drive, center control, nickel trimmings, with newest body types to meet every requirement and corresponding equipment.
$2,850 to $4,100

Marmon "48"
Six cylinders, 48-80 h. p., 145-inch wheelbase, electric starting and lighting system, left-hand drive, center control, nickel trimmings, with body types to meet every requirement and corresponding equipment.
$5,000 to $6,350



Detailed Information on Request

Nordyke & Marmon Company
Indianapolis (Established 1851) **Indiana**

"Sixty Years of Successful Manufacturing"

Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 horsepower four-cylinder car of modern refinements priced at only $1095.

R. M. OWEN & CO., General Sales Agents
REO MOTOR CAR CO., LANSING, MICH.

MOTOR Maxwell COMPANY

EXECUTIVE & SALES OFFICES
DETROIT, MICH.

WARNER

We Specialize in High-grade
Automobile Parts

Transmissions
Steering Gears
Gear Shift Levers
Differentials
Electric Starters

The Warner Manufacturing Co.
TOLEDO, O.

TOLEDO

AJAX

Mileage Contest

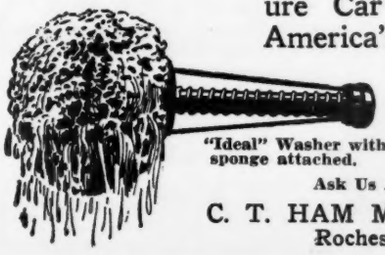
$5000 in Cash Prices

For full particulars address

AJAX-GRIEB RUBBER CO.
1796 BROADWAY, NEW YORK

LIGHT OR WATER

We supply you with the one and save you the other. Ham's Truck and Pleasure Car Lamps are America's very best.



"Ideal" Washer with sponge attached.

Our "Ideal" Carriage Washers and Automatic Water Savers save the water.

Ask Us About Them

C. T. HAM MFG. COMPANY
Rochester, N. Y.

GOODYEAR
AKRON, OHIO

This name on Automobile Tires and Rubber Accessories signifies inherent qualities of material and workmanship that insure the maximum of service at the minimum of expense. (673)

THE GOODYEAR TIRE & RUBBER CO.
AKRON, OHIO



Patented

Manufacturers of 1913 Models Don't omit a SPARKS-WITHINGTON Fan from your 1913 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

The Sparks-Withington Co.
JACKSON MICHIGAN — WALKERVILLE CAN.

The *Pilot*

"THE CAR AHEAD"

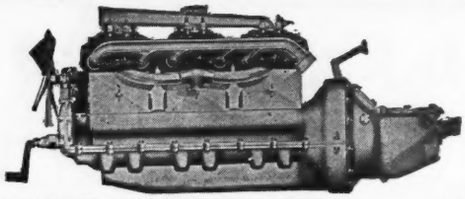
Three Great Models: Pilot 40—Four cylinders, 4½x5; brake test, 53 horse-power; 120" wheel base; price, $2000. Pilot 50—Four cylinders, 4½x6; brake test, 59 horse-power; 126" wheel base; price, $2250. Pilot 60—Six cylinder, 4x6; brake test, 67 horse-power; 132" wheel base; price, $2500.

The Car Without a Mechanical Defect

Teetor "T" head motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Eisemann magneto, Stromberg carburetor, handsome jewel bodies with ventilating windshield. Completely equipped, with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States.

Write for our beautiful art book showing cars in detail

PILOT CAR SALES COMPANY Richmond, Indiana



BEAVER "SIX" Unit Power Plant

Beaver "Sixes" offer the following 1914 features: long stroke (3¾ x 5); just right power, 45 H. P.; 3-point suspension; large valves with enclosed action; enclosed fly wheel; 3-speed transmission; noiseless, vibrationless, oil and dust tight action; arrangement for installation of any make Electric Starting and Lighting System. Write for catalog and prices.

BEAVER MANUFACTURING CO.
Builders of 2, 4 and 6 Cylinder Motors
2800 First Avenue MILWAUKEE, WIS.

SOLAR LAMPS

A discriminating public has voted in favor of Solars—the quality motor lamps.

Backed by 15 years of specialization. Found on more high-grade cars than all other makes of lamps.

A Solar Lamp for every motor need.

WRITE FOR CATALOG

THE BADGER BRASS MFG. CO.
KENOSHA, WIS. NEW YORK CITY



LINDHE "LAMINATED" SHIMMING BRASS
with Laminations of .002" or of .003".
For Adjustments of Bearings. No More Filing.

A perfect reduction is obtained at once simply by loosening one corner of a layer with a knife or other sharp instrument and peeling it off. The rest of the shim remains as solid as ever.

Stock Sheets and Box Assortments of Strips—On sale by all leading Jobbers and Dealers.
Special stamped shapes supplied to manufacturers when desired.

LINDHE SHIM CO., 210-212 Canal St., NEW YORK
RHINELAND MACHINE WORKS CO., 140 W. 42d St., N. Y.
(Sales Agents for the United States)

UNIVERSAL JOINTS
"SPICER" MEANS QUALITY

"SPICER" on universal joints means quality, and "SPICER" quality has been a standard ever since universal joints have been manufactured.

Let us quote you prices on your requirements

SPICER MFG. CO., Plainfield, N. J.

Domestic Representatives: K. Franklin Peterson, 122 So. Michigan Blvd., Chicago. Thos. J. Wetzel, 17 West 42nd St., New York. L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit. **Foreign Representative:** Benjamin Whitaker, 21 State St., New York.

The Kinsey Manufacturing Company, Toledo, Ohio

MANUFACTURERS OF AUTO PARTS

KINWOOD RADIATORS, FENDERS
KINWOOD OILERS, GASKETS,
KINWOOD STEEL FRAMES,
ETC., ETC.

SPECIAL METAL STAMPINGS



Borland Electrics

Agency territory is now being offered to those reputable and well-equipped dealers who are as particular about selling the best as we are about making it.

The Borland-Grannis Co.
Executive offices & factory
310 E. Huron St., CHICAGO

Get acquainted with the standardized "Cole"

the car that is writing gasoline history.
Learn what the

Cole franchise for dealers

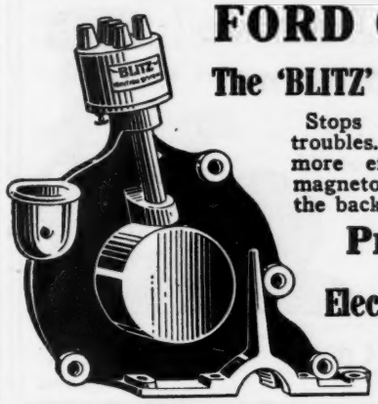
will mean to you if you happen to be located in open territory.

Cole Motor Car Co. of Indianapolis



KEATON NON-SKID TREAD
has four times the wearing service of the ordinary non-skid. Users will tell you that they have run Swinehart Keaton Non-Skid Tread Tires a whole season without having them lose their anti-skid effectiveness. Call at any one of our stores and investigate them. We also make a complete line of Smooth Pneumatic Tires of best quality. Branches and distributing agencies in all leading cities.
SWINEHART TIRE & RUBBER COMPANY
1206 North St., Akron, Ohio

FORD OWNERS



The 'BLITZ' Ignition System

Stops all of your ignition troubles. Makes your car more efficient. Uses Ford magneto current. Eliminates the back kick.

Price $20.00

Electrical Specialties Mfg. Co.
Omaha, Neb.

HERZ PLUG

"Bougie Mercedes"

One great point of overwhelming superiority in HERZ PLUGS is the unbreakable Double-Stone Insulation, which replaces the porcelain of ordinary plugs. The inner stone is ground into the steel fitting, without packing. The outer stone is Blue Enameled, a feature by which HERZ PLUGS can readily be recognized.
Other important Herz features are the Four Sparking Points, the Platinum-alloy Electrode, and the Self-cleaning construction. Every Herz Plug is

Guaranteed a Full Year

HERZ & CO., 295 Lafayette St., N. Y.
Makers of the HERZ MAGNETO



HAYWOOD STEAM VULCANIZERS

THE PROFIT MAKING PLANTS



The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from $25 to $500

Write for Catalog B.

HAYWOOD TIRE & EQUIPMENT COMPANY
524 N. Capitol, Indianapolis, Indiana

You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

Use the New Positive Lock Stop

TWITCHELL AIR GAUGE

and save your tires



"TIRE INSURANCE FOR $1.00"

Simple, Accurate, Durable and Easily Read

For sale by Jobbers, Dealers, Garages, or

The Twitchell Gauge Co.
1201 Michigan Avenue **Chicago, Illinois**

STAR BALL RETAINERS

STAR BALL RETAINERS are famous wherever ball bearings are known. The best bearing service attends the car equipped with STAR BALL RETAINERS. We also manufacture more thrust bearings than any concern on the market. Send us your requirements.

THE STAR BALL RETAINER CO.
LANCASTER, PA.

Is Electricity Cheaper than Gas Light?

How much does a battery cost How long are batteries lasting? How much do other repairs and replacements cost?

The average user of Prest-O-Lite pays $10 a year, or less, for light.

If any editor, or any advertiser, claims that electric lights cost less to use than Prest-O-Lite, you can easily prove that he is either ignorant or worse.

If you want the facts, write us.

The Prest-O-Lite Co., 233 Speedway Indianapolis, Ind.

Is There a

PAIGE

Dealer In Your Territory?

If not, write or wire us today. The Paige "36" at $1275 and the Paige "25" at $950 are the leaders in the popular price field. You want them, if you can get them.

PAIGE-DETROIT MOTOR CAR CO.
304 Twenty-First Street, DETROIT, MICHIGAN

The unparalleled success of

NEWTONE MOTOR HORNS

has been most gratifying



Torpedo Type

Put a "Newtone" on your car

Price $20

Automobile Supply Mfg. Co.
220 Taaffe Place, Brooklyn, N. Y.

Great Western

1913 FORTY FULLY EQUIPPED $1585

LUXURY —— POWER

ABSOLUTE SILENCE

WRITE FOR OUR NEW CATALOGUE

GREAT WESTERN AUTOMOBILE CO.

DEPT. 20 PERU IND.

"Imperial Twelve"

Garage Compressors



A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

Booklet 608

Ingersoll-Rand Company

New York London

100 Per Cent Efficient

Leece-Neville

Starting and Lighting System

Write for Details

The Leece-Neville Company

Cleveland, Ohio

(3)

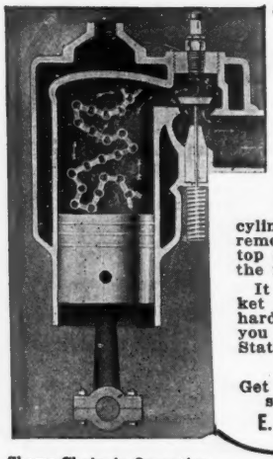
LAUTH-JUERGENS

One, Two, Three and Five Ton Trucks

"Guaranteed for Life"

"Guaranteed Service"

The Lauth-Juergens Motor Car Company, Fremont, Ohio



Over 3000

Jobbers and Dealers in the United States Now Recommend and Sell the Michener Chain Carbon Remover.

Being a flexible chain, made of a light gauge wire, a special composition, 90% copper, it cannot scratch or score a cylinder. I positively guarantee that it will remove all the carbon from the piston head, top and sides of cylinders without injury to the motor.

It is the only carbon remover on the market today that will absolutely remove the hard scales of carbon. Get two chains and you can clean two cylinders at same time. State kind of motor when ordering.

Price 75c, or 3 for $2.00

Get them from your dealer, or if he cannot supply you, I will send direct postpaid.

E. S. MICHENER, WASHINGTON ST., NEW CASTLE, PA.

Shows Chain in Operation

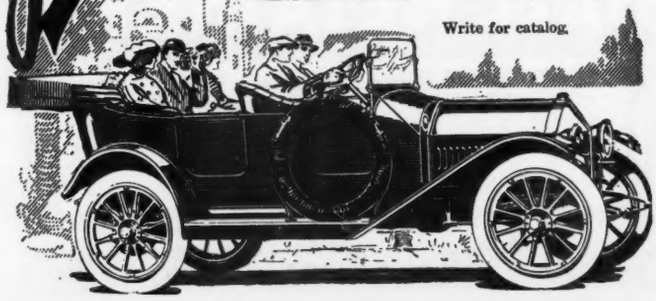
Jackson

NO HILL TOO STEEP NO SAND TOO DEEP

Olympic	"four" Five passenger.	$1500
Majestic	"four" Five passenger.	$1975
Sultanic	"six" Seven passenger.	$2650
Sultanic	"six" Five passenger.	$2500

Jackson Automobile Co., 1207 E. Main St., Jackson, Mich.

Write for catalog.



PREVENT BROKEN SPRINGS

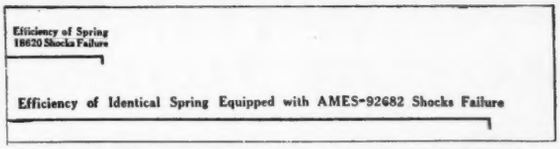


CHART SHOWING COMPARATIVE TESTS ON THE LIFE OF A SPRING, SHOWING 497 PER CENT. EFFICIENCY OF AMES AUTOMATIC SHOCK ABSORBER IN PREVENTING SPRING BREAKAGE

Full details of this vigorous test sent on application

The AMES AUTOMATIC SHOCK ABSORBER

1788 BROADWAY NEW YORK

WARD-LEONARD SYSTEM

WARD LEONARD



Faultless Lighting Infallible Starting

Lighting - Starting

WARD LEONARD ELECTRIC CO.

BRONXVILLE N. Y.

SUSPENSION BALL BEARINGS

Two Rows of Balls and All Balls Loaded All the Time



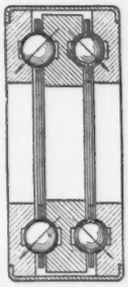
Now used in various kinds of machinery,

Motor Cars

and other vehicles and for the equipment of our Special Double Row Ball Bearing Shaft Hangers.

We also make Plain and Grooved Thrust Bearings.

Write for Booklet M



SUSPENSION ROLLER BEARING CO., Sandusky, Ohio

Dart

MOTOR TRUCKS

THREE EXCEPTIONAL MODELS:

Model ED—1,000 lbs. capacity (2 cyl.)	$ 750
Model B—1,000 to 2,000 lbs. capacity (4 cyl.)	1,100
Model C—2,000 to 3,000 lbs. capacity (4 cyl.)	1,775

Write us for full information and liberal specifications.

THE DART MOTOR MANUFACTURING CO.

WATERLOO, IOWA (18)

The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

BRANCHES AND REFILLING STATIONS:

Warren, Ohio	San Francisco, Calif.	Los Angeles, Calif.
Chicago, Ill.	Buffalo, N. Y.	New York City
Detroit, Mich.	Atlanta, Ga.	Syracuse, N. Y.
Camden, N. J.	Dallas, Texas	Minneapolis, Minn.
Philadelphia, Pa.	San Antonio, Tex.	Toronto, Canada
Kansas City, Mo.	Boston, Mass.	Indianapolis, Ind.

THE MASTER CAR **FIAT** 16th YEAR

6 Cyl. 50 H. P. $5000
4 Cyl. 55 H. P. $4500
4 Cyl. 35 H. P. $4000

F. I. A. T.

POUGHKEEPSIE **NEW YORK**

EISEMANN

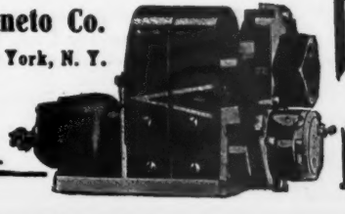
Automatic Spark Control

Quality—not only as to efficiency and manufacture, but in design as well—characterizes all Eisemann Ignition systems. Not only do they insure hot fat sparks at all speeds—but they are simple, accessible and fool proof.

The Eisemann Magneto Co.

225-227 W. 57th St., New York, N. Y.

Indianapolis, 514 North Capitol Ave.,
Detroit, 302 Woodward Ave.



The Popular, Top-Notch Seller

Trade **KANTALEVER** Mark

Emergency Spring Repairer

(Manufactured Under a Basic Patent)



Repairer attached to spring broken in center at spring bolt—a common occurrence. Taken in time by attaching Auto Spring Repairer, there need be no cause for alarm. May be placed in other positions wherever springs are broken.

The Auto Spring Repairer will carry even for weeks, until the broken broken springs intact spring can be replaced and in working order with a new one.

WARNING TO THE TRADE—We are the sole owners of the basic patent on the AUTO SPRING REPAIRER and will promptly prosecute any infringers of this patent.

THE LOGICAL BASE OF SUPPLIES—

THE MOTOR CAR EQUIPMENT COMPANY

le—Positively—Only—Absolutely **55C Warren St., New York City**





S. R. O.

Oldest and Leading European

Ball Bearing

Mea Magneto

Write for Particulars and List of Users

MARBURG BROTHERS, Inc.

Sole Importers

Detroit **1790 Broadway, New York** Chicago

AUBURN 1913

"Rides Like a Pullman—Pulls Like a Locomotive"

38 Years' Manufacturing Experience Built Into Every Model

Model 33M — Two Passenger Roadster; 33 H. P. long stroke motor 3¾x5¼ — Price, **$1150.**

Model 33L — Five Passenger Touring Car; 33 H. P. long stroke motor 3¾x5¼ — Price, **$1150.**

Model 40A — Two Passenger Roadster; 40 H. P. long stroke motor 4½x5 — Price, **$1650.**

Model 40L — Five Passenger Touring Car; 40 H.P. long stroke motor 4½x5—Price, **$1650.**

Model Six—45B—Two Passenger Roadster, 45 H. P. long stroke motor 3¾x5¼ — Price, **$2000.**

Model Six—45—Five Passenger Touring Car, 45 H. P. long stroke motor 3¾x5¼ — Price, **$2000.**

Model Six—50—Six-Cylinder Touring Car, 50 H. P. long stroke motor 4⅛x5¼—Price, **$3000**

Send for 1913 Catalog

AUBURN AUTOMOBILE COMPANY, Auburn, Ind.

Inter-State

Model 45, $2750

6 Cylinder, Left-hand Drive
Center Control
132-inch Wheel Base.

INTER-STATE AUTOMOBILE CO.
MUNCIE, INDIANA

You Can Walk From There to Anywhere.

THE WOODSTOCK

The Hotel of Comfort

43rd St., Just East of Broadway, New York



Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates
From $2.50 to $4.00 Per Day

W. H. VALIQUETTE
MANAGER

Also **The Berwick**, Rutland, Vt.

The 6-Cylinder, Reasonably Priced

de Soto Six

55 H.P.

The car with a stronger appeal than any recent product of the trade—the one that meets a popular demand. We have an unusually attractive proposition for dealers. Write at once for free catalog and full particulars.



Sells for $2,185

de Soto Motor Car Company, Auburn, Ind.

"VULCAN" SPRINGS

THE GOOD KIND



TYPE A

When next you are needing Automobile springs, we ask you to consider the Vulcan — a thoroughly good spring.

Stock on Hand to Fit:

Ford	Maxwell	Hudson
Overland	E. M. F.	Chalmers
Buick	Flanders	Oakland
Reo	Hupp	R. C. H.
Cadillac	Regal	Everett

JENKINS MFG. COMPANY
118 N. Third St. ST. LOUIS, MO.

CHASE

The Emblem of Efficiency

Chase Motor Trucks

It is natural that the manufacturer who persistently builds towards an ideal should succeed in his share of the world's work. We sold more light delivery trucks last year than any other manufacturer in the country. Our working ideal is service.

Write us for Profitable Literature
"Ask for your copy G-5 now"

6 Efficient Models Every Style of Body
Capacities—500 to 4000 Lbs.

Chase Motor Truck Company
303 So. West St. Syracuse, N. Y.

Safety First

Take no chances on Slippery Pavements and muddy roads.

Equip all Four tires with

Weed Anti-Skid Chains

Universally used—Increasing demand—Easily handled—No dull season—No dead stocks.

Sold by all Reputable Dealers
WEED CHAIN TIRE GRIP COMPANY, NEW YORK

RUDGE-WHITWORTH
DETACHABLE WIRE WHEELS

Fitted With HOUK Quick Detachable Rims

Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

GEO. W. HOUK CO.
5002 LANCASTER AVE., PHILADELPHIA, PA.

Herreshoff

THE THOROUGHBRED CAR

Electric Self-cranking, Electrically Lighted
Four Forward Speeds

"Six Thirty-six" Touring Car and Roadster, $1850
Model 30 Touring Car...$1350 Model 30 Roadster...$1250

LIVE WIRE DEALERS
WRITE FOR UNALLOTTED TERRITORY

HERRESHOFF MOTOR COMPANY
Detroit, Michigan, U. S. A.

McFARLAN

Electric Lighted **SIX** Self Starting

SERIES "S"—45 H. P., 2, 4 and 5 Pass.—$2,300
SERIES "T"—50 H. P., 2, 4 and 5 Pass.—$2,500
SERIES "M"—60 H. P., 2, 4, 5 and 7 Pass.—$2,750

New Six Passenger, Coupe and Limousine Bodies slightly higher.

TERRITORY OPEN FOR PROGRESSIVE DEALERS

Pioneer Six-Cylinder Car Builders of America

McFARLAN MOTOR CAR CO., Connersville, Ind.

The Kentucky Thoroughbred

Ames "45"

With Electric Self-Starter. An Electric Starter of proved efficiency is one of the features of the Ames "45"—a car with every essential refinement contributing to comfort, yet priced at $1,785. Without Starter, electric lighted $1,635. Made with well-known "Amesbilt" body. 5-passenger, motor-driven electric lights. Perfect cooling system. Force-feed pump. Schebler Carburetor, new Remy dual system high tension magneto, oil-driven pumps. Sight-feed. Warner multiple disc, Raybestos-lined clutch. Selective transmission, 3 speeds forward and reverse. Stewart speedometer. Best mohair top, side curtains, boot. 36x4-inch Tires Powerful, speedy—comfortable—unequalled at price. Write for catalog.



$1,785

AMES MOTOR CAR COMPANY
Owensboro, Ky.
(19)



SKID
BLOWOUTS
RIMCUTS
PUNCTURES
WEARING OFF OF RUBBER
NIT

Each section 2 in. wide. They hook to rims. Try two or three sections over any old blowout.

Special Prices to the First in New Territory

KIMBALL TIRE CASE CO., 173 BWD., COUNCIL BLUFFS, IA.



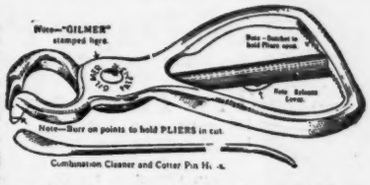
Heals Tire Cuts
The Motorist's Self-Vulcanizer

Fills the cuts and holes, solidifies quickly and becomes like a part of the tire. Easy to use—clean cut, fill with Narco T. C. F., allow to stand over night. Result—a new tire. $1 the tube; in Canada, $1.50.

National Rubber Company
4411 Papin St. St. Louis, Mo.

GILMER Tire Repair Pliers

are as necessary to Car Users as a pocket knife is to you—as useful as a hair pin to a woman. There are 300,000 Car Owners in the United States who KNOW that it pays to repair small cuts in Tires. ARE YOU ONE OF THEM? Hadn't you best write for free copy of "Tire Insurance," or better, send a dollar for a pair of nickel plated PLIERS and combination cleaner and cotter pin hook They will pay for themselves the first seventy-five miles. They will pay for a set of Tires every 4,000 miles. We guarantee satisfaction.



C. WALKER GILMER, Jr.
53 North 7th Street Philadelphia, Pa.

1914 *Marion* "Six"

HAVE you read all about the big, new six-cylinder MARION? See the advertisements in all the national and trade magazines; wire us about our unusual dealers' contract for 1914.

THE MARION MOTOR CAR CO.
902 Oliver Avenue, INDIANAPOLIS

KEETON
DETROIT U.S.A.

"SIX-48"
$3250
Fully Equipped



Riverside Touring Car

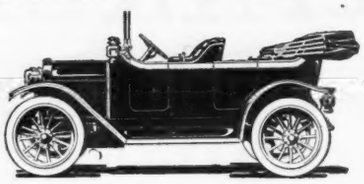
Write for Booklet

Keeton Motors Ltd.
Brantford Ont. Canada

Keeton Motor Co.
Lawton & M.C.R.R.
PHONE WAL. 1067 *Detroit U.S.A.*

The Detroiter—$850 FULLY EQUIPPED

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

BRIGGS-DETROITER COMPANY, 455 HOLBROOK AVE., DETROIT, MICH.

WRITE FOR SPECIFICATIONS

DUPLEX EXTERNAL BRAKES

ACT INSTANTLY

Whether car goes backward or forward

The Royal Equipment Co.

Bridgeport, Conn.



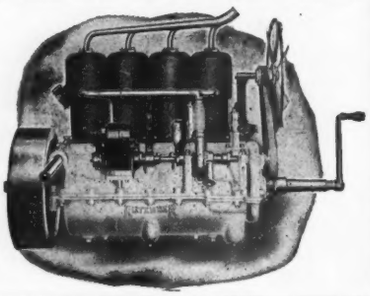
THE RUTENBER MOTOR

MANUFACTURED SINCE 1901 FOR HIGH GRADE

AUTOMOBILES and TRUCKS

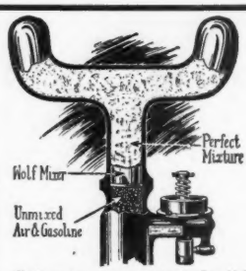
3¾ x 5¼ four and six cyl.
4¼ x 5¼ four and six cyl.
Standard or Unit and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types. All L Head 4 Cycle.

Manufacturers are invited to investigate our service and our facilities. Literature on request.



The Rutenber Motor Company

Marion, Indiana



You Are Helpless

to prevent the increased cost of Gasoline, but you CAN cut your consumption

15 to 40 per cent with

Wolf Gasoline Savers

Get more power and flexibility.
Less noise, vibration and carbon deposit.
No moving or delicate parts.
No screens to clog.
Inserted in manifold in a few minutes.
No holes to bore.

Price, sizes up to
1½ inch..$1.50; 1 9/16 to 2 inch..$2.00; Special Ford type..$1.00
State make and model of car

SENT POSTPAID ON RECEIPT OF PRICE

Sold on Two Weeks' Trial—Liberal Proposition to Agents

Approved Auto Specialties Co., 1731-33 Broadway, New York City



We Ship On Approval

PREPAY EXPRESS AND ALLOW

30 Days' Free Trial

The best "Nonskid" puncture-proof device for automobiles, commercial cars and motorcycles.

Try Them At Our Expense

Be your own judge—don't take any one's word for it. *"The proof of the pudding is in the eating."*

Perfect Score in 4 Glidden Tours
Twin Cities to Fargo, N. D., 1909.
Twin Cities to Helena, Mont., 1911.
New York City to Jacksonville, Fla., 1911.
Twin Cities to Winnipeg, 1912.

It only costs one cent to learn our prices and guarantee on "Brictson" Detachable Treads.

Write today for full particulars

The Brictson Mfg. Co.

1273 Main St. BROOKINGS, S.D

SCHAFER BALL BEARINGS

MADE IN GERMANY SOLD IN AMERICA



When you buy SCHAFER BALL BEARINGS you are not experimenting because SCHAFER BALL BEARINGS have for years been recognized as the standard of bearing quality. They are made in Germany of the best steel, and are now in universal use throughout the world.

BARTHEL & DALY

42 BROADWAY NEW YORK

FEDERAL TIRES

give "Extra Service"

Federal Rubber Mfg. Co. Milwaukee

OUR 1914 Models will be revelations in mechanical features, refinements, finish, specifications, accessories and prices. Write for latest catalog and agency proposition for 1914.

Pullman Motor Car Co.

York, Pa.

STAPLEY TIRE PUMP



It Beats Any Tire Pump

The Stapley is a *compound* pump—inflates quickly and the operation is easy. Seamless brass tube cylinders, non-leakable joints, automatic valve and heavy cast base—everything about it up to the BRIDGEPORT BRASS Co. Standard of Quality.

Price Without Gauge $4.00 — With Gauge $6.00

THE BRIDGEPORT BRASS CO.
P. O. Station A Bridgeport, Conn.

J-M NON-BURN BRAKE LINING Adds Power to the BRAKE



The wonderful gripping power of this lining enables you to stop your car almost instantly in emergencies, or gradually—according to the pressure on brake lever.
Outlasts twelve ordinary linings because it is made of pure Asbestos fibre reinforced with strong brass wire. Cannot char, burn or disintegrate. Is not affected by water, oil, gasoline or grit.
Name on every piece protects you against inferior substitutes Order direct from us if not at your dealers.

Ask our nearest Branch for Booklet

H. W. JOHNS-MANVILLE CO.

Albany	Cincinnati	Kansas City	New Orleans	San Francisco
Baltimore	Cleveland	Los Angeles	New York	Seattle
Boston	Dallas	Louisville	Omaha	St. Louis
Buffalo	Detroit	Milwaukee	Philadelphia	Syracuse
Chicago	Indianapolis	Minneapolis	Pittsburgh	1958

DIXON'S No. 677 GRAPHITE GREASE



Will pay for itself many times over in the reduced wear-and-tear on transmissions and differentials which its use brings about. It combines the highest lubricating value with the longest life as a lubricant—the flake graphite gives the lasting quality. You should have the book "Lubricating The Motor," No. 82.

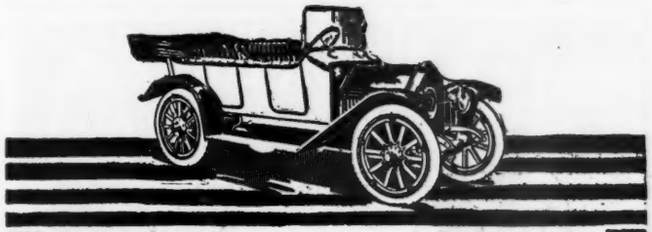
JOSEPH DIXON CRUCIBLE CO.
Jersey City Established 1827 New Jersey

Elyria-Dean
TRADE MARK

TUTO 2-TONE HORN Electrically transmits two different and distinct sounds; the degree of sound being regulated by the pressure of the thumb upon one button located on the steering wheel. One tone gives polite notice, the other says "Danger!" in unmistakable terms. Complete with button and cord, $25.00. Elyria-Dean products manufactured only by

THE DEAN ELECTRIC COMPANY
504 OLIVE STREET ELYRIA, OHIO, U. S. A.

"Look for Elyria-Dean where Quality's seen."



Model 5-A $1700 Touring Car Fully Equipped ***Electric Cranking and Lighting***

People who demand POWER, ENDURANCE, LUXURY and SAFETY in a motor car, drive the time-tested GEARLESS TRANSMISSION CARTERCAR. Presented in four excellent models $1600 to $2000.

Cartercar **Company,** Pontiac, Michigan
Branches: NewYork, Detroit, Chicago, Kansas City, Atlanta

Free to Dealers: BEAUTIFUL SPOONERS' HANGER

Size 11½x15½ printed in colors. Sent free to any dealer who writes on his own stationery.

Our Dealers' Proposition is waiting for you. Tells how to sell more lamps and pile up profits. Write today for hanger and dealers' proposition

The Guide Motor Lamp Mfg. Co.
E. Fourth St. 34 Cleveland, Ohio

Guide MOTOR LAMPS

METZ "Twenty-Two" Roadster



THE GEARLESS CAR
"No clutch to slip—no gears to strip."

$475
Completely Equipped

1914 Improvements

Center control, left-hand drive, 4-cylinder 22½ H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, wind shield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gal. of gasoline, climbs hills as fast as ANY stock car made. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

METZ COMPANY, - **WALTHAM, MASS., U. S. A.**

ZENITH

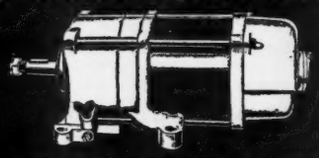


Gives Standard Carburetion

ZENITH CARBURETOR CO.
DETROIT, MICH.

Jesco TRADE MARK ELECTRIC STARTING & LIGHTING

ASSURES 100% EFFICIENCY



JONES ELECTRIC STARTER CO.
ADAMS & LOOMIS STS. CHICAGO, ILL.

R-C-H

"Twenty-Five" $900

Long Stroke Motor, Big Roomy English Body, Center Control, Left Hand Drive, Every Necessary Accessory—And a Wonderful Economy Record.

Five Passenger Touring Car, 110" wheelbase....$ 900 f. o. b. Detroit
Two Passenger Roadster, 110" wheelbase..... 900 f. o. b. Detroit
Three Passenger Coupe, 110" wheelbase..... 1300 f. o. b. Detroit

R-C-H CORPORATION
101 LYCASTE STREET, DETROIT, MICHIGAN

Detroit Mechanical Starter
For Ford Model T Cars

Enables you to crank your engine from the seat. It operates mechanically—no electricity, no gas, no air.

It is perfect in construction; simple and easy to operate.

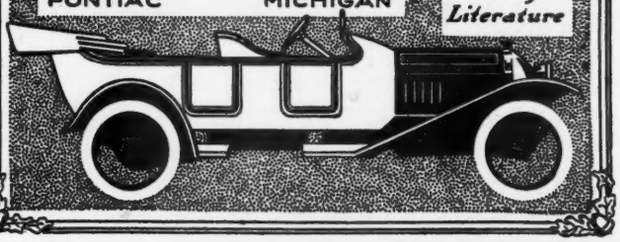
No danger from back-firing. No possible harm to the motor.

The Detroit Mechanical Starter is easily attached, light in weight, positive in operation.

It is guaranteed free from mechanical defects for sixty days and is low priced. Write us for further information.

DETROIT MECHANICAL STARTER COMPANY
1191 Woodward Avenue Detroit, Michigan

Oakland
The Car with a Conscience
OAKLAND MOTOR CAR CO.
PONTIAC MICHIGAN
Four & Six Cylinders $1000. to $3000. Write for Literature



IDEAL STEEL WHEEL (RESILIENT)
STRENGTH COMFORT BEAUTY ECONOMY
IT'S IN THE SPOKES

Makes possible the use of airless tires without sacrifice of easy riding.

Doubles the life of any set of tires.

Increases life of motor and adds to the mileage per gallon of gasoline or per charge of electricity.

Makes any car ride like a cradle.

TRY THEM AT OUR RISK

Supply Dealers and Garage Owners: Write for our agency proposition.

The Ideal Steel Wheel Company
1069 First National Bank Bldg. Cincinnati

BLACK EAGLE
Spark Plug



50¢

50c. IS ENOUGH

The *"Black Eagle"* Spark Plug *marks the dawn of a new era.* From now on *The Price of Spark Plugs will gravitate to Fifty Cents.*

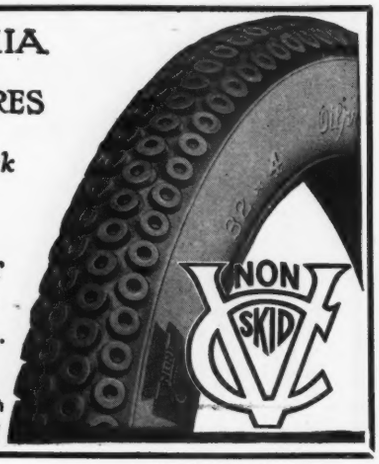
Why not be a pioneer in your territory?

The reason is apparent—none better at any price. Made in all standard threads mailed upon receipt of price.

THE STANDARD CO.
Torrington, Conn.

PENNSYLVANIA
Oilproof
VACUUM CUP TIRES

Making Their Mark Everywhere



Pennsylvania Rubber Company
Jeanette Pa.

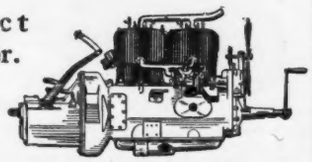
An independent company with an independent selling policy

ERGON MOTOR

Ergon Motors are "work" motors. Their Simplicity of design assures long life and ample power.

We never over contract our ability to deliver.

Three models. Model C, 3 3/4 x 4 1/2; model CX, 4 x 4 1/2; model D, 4 3/8 x 6.



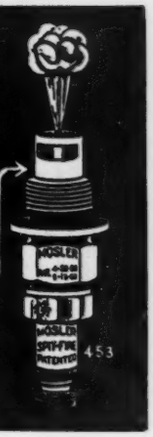
HAZARD MOTOR MANUFACTURING COMPANY Rochester, N.Y.

American Axles

Found only
on high
grade cars

THE AMERICAN BALL-BEARING CO.,
Cleveland, Ohio

Mosler
Spit Fire Plugs
are the BEST
FOR 13 YEARS HAVE BEEN LIKE THIS
INSIST ON OUR
GENUINE PLATINUM POINTED PLUGS
A.R.MOSLER & CO.,
P. O. BOX "M" MT. VERNON, N.Y.



SALISBURY

AXLES WHEELS
TRANSMISSIONS

Salisbury Wheel & Mfg. Co.
JAMESTOWN, N.Y.

Any Kind
Every Kind
Stock, or
to Blue Print

Rims

Clincher
Q. D.
Demountable
Channels

For Automobiles, Motor Trucks
Aeroplanes, Motorcycles, Bicycles

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.
R. B. ABBOTT SALES CO., Sales Agents, Detroit



Braender
Tires & Tubes
are cheapest on mileage

They are strictly high-grade—built to outlast all others—and they do it. Ask any user.

Send for price list and full particulars

Established Agents Solicited

BRAENDER RUBBER & TIRE CO.
Main Office and Factory
RUTHERFORD, N. J.
Salesrooms: 1987 Broadway, N. Y.
1211 Bedford Avenue, Brooklyn, N. Y.

Bull Dog Non-Skid

WINNIPEG

WANTS

AUTOMOBILE AND TRUCK FACTORIES

THE remarkable growth of the cities, towns and agricultural districts in Western Canada has created an UNPRECEDENTED DEMAND for MOTOR DRAWN VEHICLES of ALL KINDS. Winnipeg wants these factories and offers the best labor market in Canada. Electric power and light from 60,000 municipal plant at cost, cheap sites, low taxation and best distributing facilities in all Canada.

THIS IS YOUR OPPORTUNITY
RIGHT NOW IS THE TIME WINNIPEG IS THE PLACE

Reports furnished free on the manufacturing possibilities of any line of industry

Write CHAS. F. ROLAND, Commissioner, Winnipeg, Can.

Corcoran Lamps

GAS, OIL, AND ELECTRIC

CORCORAN LAMP CO.
CINCINNATI

KRUPP STEEL

IS NO EXPERIMENT. It is the best that brains and years of experience can produce. Manufactured in various grades for all motor car parts. Round forged bars of chrome nickel steel, grade E F 60.0, carried in stock in New York City.

THOMAS PROSSER & SON
28 Platt Street, New York City

HERCULES—"The Auto Lock That Lox"



Automatically releases

The large amount of money invested in your car *demands* at least a small amount invested in its *protection*. $7.00 is all a HERCULES costs — cheap insurance with no *premium*.

The HERCULES is *screwed* into the gear shift lever with *hardened screws* and *locked* when this lever is in *neutral*. You cannot move your car except *by hand* even though you have a self-starter.

GUARANTEED FOR LIFE

Neat and compact. Automatic in action and always attached. Fits nearly all cars using 3 or 4 speed selective type transmission.

Price, $5.00

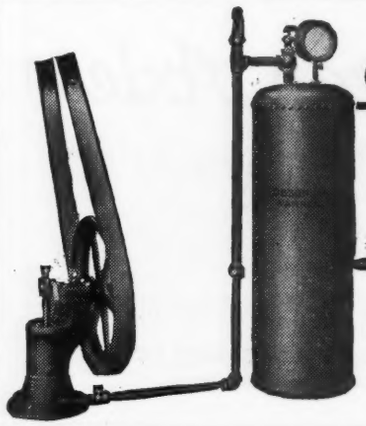
At all dealers or direct on receipt of price

State Agents Wanted
Choice Territory Open

HERCULES LOCK COMPANY
1816 E. 33rd Street, Cleveland, Ohio



Lock Attached



Air Compressors

For Private and Public Garages

Single and Double Cylinders
Air and Water Cooled Types

Jacobson Machine Mfg. Co., Warren, Pa.

HASTINGS & ANDERSON CO.
Chicago, Ill.
Western Representatives

THE ROBBINS SEDAN BODY

You have seen it—and admired it. Probably you did not know that it was a Robbins body. Probably you have wondered whose design and construction produced that handsome Sedan.

For your own comfort, you will need a Sedan body this winter.

LET US DESIGN IT

IRVIN ROBBINS & COMPANY

Address Sedan Dept. *10th and Canal, Indianapolis, Ind.*

"THE TUGBOAT OF LAND COMMERCE"

SOLVES THE HEAVY TRUCKING PROBLEM

Knox

MARTIN TRACTOR



SEND FOR CATALOGUE

KNOX AUTO CO., SPRINGFIELD, MASS.

DURNO STARTER



Compressed Air — Kellogg Pump — No air in engine cylinders — No distributor to wear — No check valves to carbonize. **Starts Motor From Outside.** Fits any car.

SPINS MOTOR

1914 BOOK

Durno Air Jack Lifts Largest Car Easily

No Heavy Battery — No wires — No expense to maintain — Easy to install — Easy to understand — Saves time, money and disposition. **Air for Tires.** Two years' guarantee.

DURNO MANUFACTURING CO., Inc., 163 St. Paul St., Rochester, N. Y.

Ford

THE UNIVERSAL CAR

It's the car with the down keep. The Ford's surprisingly low first cost is matched by its low cost of maintenance. And six thousand service stations—where all Ford repairs are to be had at reasonable prices—insure its constant and efficient service.

Here's the test: 300,000 Fords now in service. Runabout $525; Touring Car $600; Town Car $800—f. o. b. Detroit, with all equipment. Get catalogue and all particulars from FORD MOTOR COMPANY, Detroit.

Red Head

REG. U.S. MAGNETO PAT. OFFICE PLUG



All Sizes
All Styles
Porcelain or Mica
$1.00

EMIL GROSSMAN COMPANY
Manufacturer
250 WEST 54th ST.
NEW YORK
Detroit Branch and Factory
844 Woodward Avenue

Cut Gears of Quality Complete Differentials

NEW PROCESS GEAR CORPORATION
SYRACUSE, N.Y

SOONER OR LATER

you will ride on

Essenkay
"ENDS TIRE TROUBLES"

WHY NOT NOW?

Dealers write for prices and discounts.

The Essenkay Products Company
1127 W. 37th St., CHICAGO

Cross-Rolled Steel in Springs Cuts Up-Keep

In this new process, the steel is worked both longitudinally and transversely. So we get superior strength and toughness. We use this process exclusively in our Chrome-Vanadium Brand of Springs.

Find out more about them. It will make a tremendous difference in the riding qualities of your car.

TRADE CLEVELAND CANTON MARK

In five years not one Cleveland - Canton Chrome - Vanadium spring returned because of breakage or settling.

Best Grade—Chrome-Vanadium
Next Best—Special Analysis

Let us send you full particulars

The Cleveland-Canton Spring Co., Canton, Ohio, U.S.A.

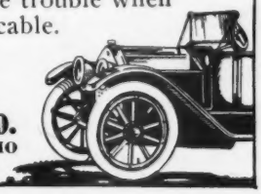
Packard CABLE

Lasts As Long As Your Car

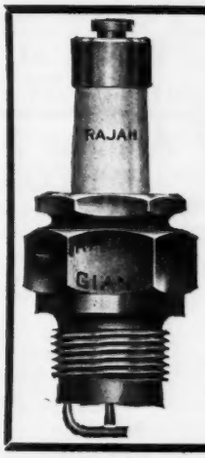
Packard cable saves the cost and annoyance of frequent wiring. The covering resists oil, water and dust.

You get home without wire trouble when your car carries Packard cable.

Write for full information.
Send name of your garage man.



The Packard Electric Co.
Dept. C. WARREN, OHIO (19)



RAJAH GIANT PLUG

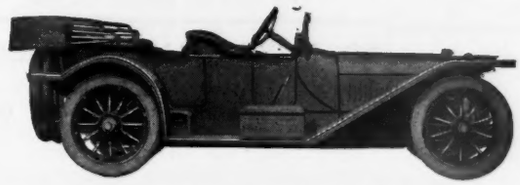
Extra strong and heavy. Perfectly simple—only four parts, which are easily taken apart for repairs or replacement. Only highest grade, imported, hard fire porcelains used. Minutely accurate, well finished machine work. No thumb screws—a Rajah Clip Terminal supplied with every Plug. Price, $1.50 postpaid—the most economical Plug made. Send for catalog.

Rajah Auto Supply Co., Bloomfield, N. J.

John Millen & Son, Limited—Montreal, Toronto, Vancouver, Winnipeg

AMERICAN UNDERSLUNG

For Season of 1914--Deliveries Now



Two SIXES and a FOUR

Interesting booklets to prospective purchasers for the asking: to dealers the fairest sales agreement ever written:

AMERICAN MOTORS COMPANY *Manufacturers* **INDIANAPOLIS**

FINISHED CRANK SHAFTS

COMPLETE CONNECTING RODS

COLD DRAWN STEEL SHAFTING

Screw Stock, Flats, Squares, Hexagons and Special Shapes

FINISHED MACHINE KEYS - MACHINE RACK

All material finished to a superior degree of accuracy

STANDARD GAUGE STEEL CO.
BEAVER FALLS, PA.

KINGSTON CARBURETORS

Save Money by Economizing Gasoline

Five floating bronze ball valves opening automatically under different motor suctions supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather.

Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment

Made by the oldest manufacturers of carburetors in America

ESTABLISHED 1895

BYRNE, KINGSTON & CO., Kokomo, Ind.

INTERLOCKS
Double Your Mileage

INTERLOCKS make new tires wear twice as long, or give you an extra season's wear out of old tires.

More than that, **Interlocks** give you confidence that you will not have blow-outs, rim cuts or punctures to spoil your motoring pleasures.

Interlocks are complete inner tires—not inner shoes—placed between the outer casing and inner tube to strengthen the casing and protect the tube from punctures. They insure safety—make new tires give twice the usual mileage, and add 1000 to 5000 miles to old ones. Don't affect resiliency.

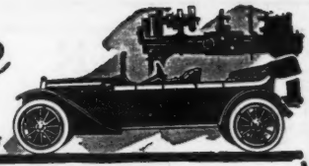
Car owners and dealers—write for our booklet giving facts about road tests, prices, testimonials, and our 1913 proposition.

DOUBLE FABRIC TIRE CO., 128 W. 9th St., Auburn, Ind.



The Clearing House of the Motor Car Industry

For Second-hand Shop Equipment - Used Cars - Parts and Accessories



1" one time, $4.50; 2" one time, $8.75; 3" one time, $13; 4" one time, $16.75. Write for rates of larger spaces and longer terms.

Times Square Automobile Co.

Bargains for Everybody

Our Motto: 50c On the Dollar

We have just received a large consignment of well known

Touring Cars

NEW 7 PASSENGER, 40 H. P.

Regular Price.....$1750
Our Price..... 885

NEW 5 PASSENGER, 30 H. P.

Fully equipped. One of the best makes; light, powerful and reliable.
Regular Price.....$1250
Our price..... 700

NEW 1913 TRUCKS

Just what you are looking for. Size, 1 ton. Continental motor, Brown-Lipe transmission, Sheldon axles, Bosch magneto, and every desirable feature.
Regular Price.....$1850
Our Price..... 1250

NEW 4 PASSENGER, 35 H. P.

6 cylinder cars. The greatest bargain in the world.
Regular Price.....$1850
Our Price..... 895

NEW ROADSTER, 35 H. P.

6 cylinder; long wheel base, and very racy.
Regular Price.....$1850
Our Price..... 895

BODIES, NEW, ALL SIZES

Less than half-price.
$25.00 to $125.00

ENGINES, NEW, COMPLETE

Motors, many different makes.
From $60.00 to $350.00

NEW DISCO STARTERS

Regular Price.....$30.00
Our Price..... 7.50

Big bargains in tires, windshields, tops, magnetos. In fact, everything pertaining to an automobile.

Send for our "Price Wrecker" free.

TIMES SQUARE AUTOMOBILE CO.
1210-1212 Michigan Ave., Chicago, Ill.
S. W. Cor. 56th & Broadway, New York City

Special or Contract Work

and development of new ideas will receive our prompt attention. We have an entirely new equipment of turret lathes, broaching machines, worm and worm gear machines, lathes and other necessary tools, so that large contracts can be handled to advantage by us. Send blueprints or samples of articles you want manufactured, and we will give you figures on such articles, ready to ship.

UNIVERSAL MANUFACTURING CO.
1204 18th Street, RACINE, WISCONSIN

TIRES —— TIRES

All New 1913 Stock
Direct from leading tire manufacturers
WHILE THEY LAST

Size.	Casing.	Tubing.	Reliners.
28x3	$ 7.20	$1.90	$1.80
30x3	7.65	1.95	1.90
32x3	7.80	2.05	1.95
30x3½	11.00	2.70	2.60
32x3½	12.00	2.90	2.65
32x4	15.70	3.60	2.80
33x4	16.00	3.70	2.85
34x4	17.25	3.80	2.90
35x4	17.50	3.90	2.95

C. O. D. orders sent same day as received upon receipt of 10%, subject to your examination.

PARA AUTO TIRE CO.
Phone Calumet 2814
1419 MICHIGAN AVE. CHICAGO

Annular Ball Bearings REGROUND

We carry a complete stock of reground bearings of all makes and sizes, for immediate exchange.

Get Our Prices

Ahlberg Bearing Co.
2640 Michigan Avenue
CHICAGO, ILL.
1790 Broadway, New York City
806 Woodward Ave., Detroit, Mich.

PULLMAN TIRES AND TUBES

Quality at a Minimum Cost
Every One Guaranteed

PULLMAN TIRE CO.
1268 Bedford Ave. Brooklyn, N. Y.
Dealers, write for agency proposition.

Peerless Auto Top Dressing
Waterproofs leaking mohair, duck and canvas. Makes old tops look like new.
1 gal.....$3.75 ½ gal.....$1.98
¼ gal.....$1.04

Peerless Leather Top Dressing
A preserver for all rubber, leather and pantasote. Does not stiffen or harden the top.
1 gal.....$8.50 ¼ gal.....$ .98
½ gal.....$1.85 ⅛ gal.....$ .51

Peerless Lining Dye
For dyeing linings of all tops and curtains a black, uniform color.
1 gal.....$3.00 ¼ gal.....$ .85
½ gal.....$1.60 ⅛ gal.....$ .45

Peerless Back and Cushion Dressing
Renews and softens leather seats and cushions. Will not crack, chip or peel, wash or rub off.
1 gal.....$3.50 ¼ gal.....$ .98
½ gal.....$1.85 ⅛ gal.....$ .51

Peerless Extra Fine Black Japan
Air drying with a high gloss finish on lamps, radiators and fenders. Will not crack, chip or peel.
1 gal.....$3.75 ¼ gal.....$1.04
½ gal.....$1.98 ⅛ gal.....$ .54

Peerless Fender Japan
Heavy bodied, air drying. No primer or undercoat required.
1 gal.....$3.75 ¼ gal.....$1.04
½ gal.....$1.98 ⅛ gal.....$ .54

Peerless Extra Fine Black Baking Japan
For brass, nickel or iron. Bakes to a high gloss, egg shell gloss or dull finish that will not crack, chip or peel.
1 gal.....$3.75 ¼ gal.....$1.04
½ gal.....$1.98 ⅛ gal.....$ .54

Ask your dealer and jobber, or send direct to us

The Columbus Varnish Co.
COLUMBUS, OHIO

APCO——FORD SPECIALTIES

There Are Forty of Them
FREE CATALOG
AUTO PARTS CO. Providence, R. I.

AUTOMOBILE BODIES

We need some roadster bodies, new or used. Send us list and description of your stock. We have customers for all types. We also have some bargains in any style body. Write us what you need.

Paul Murray, Automobile Body Broker
518 Indiana Trust Bldg. Indianapolis, Indiana

SPECIAL BARGAINS

Electric Horn $2.90
Storage Batteries, guar. 6-60..... 7.00
Adjustable Bumpers..... 2.95
Other specials listed in our **Bargain Sheet**
WRITE FOR IT NOW
Fred Allen Auto Supply Company
1610 Michigan Ave., Chicago

FORD OWNERS

and others owning brass-trimmed cars can silver-plate the parts and give the car the 1913 white metal finish by using "U-KAN-PLATE" Silver Plating and Polish. It is a cleanser. It brightens the metal, keeps the car in classy shape. No mercury in it; no acids. Ask your dealers. Quart can (enough for a car) $2.00; pint can $1.25; half-pint can, 75c, or send for 10c sample. Agents wanted everywhere. A. R. Justice Co., 619 Chestnut St., Philadelphia.

STOP THE AUTO THIEF—You can realize on your insurance policy if your car is stolen, but what of the 60 days waiting for proof, and you without a car? If equipped with a

Combination Ignition Lock

you are absolutely insured against theft. Inexpensive; simple; no keys. Ask for catalog.
AUTO COMBINATION MFG. COMPANY
1467 Michigan Avenue, Chicago

NO MORE BRASSY LOOKING NICKEL PLATE

Sil-Cote cleans and polishes the nickel and deposits a coating of pure silver on all parts where the brass shows through. Changes brass to silver plate with one application. If your dealer has none, take no substitute. Send 25c for trial size of genuine Sil-Cote. Other sizes—½ pint, 60c; 1 pint, $1; 1 quart, $1.75; ½ gallon, $3. Dealers write for agency proposition.

K. & G. MANUFACTURING & SALES CO.
638 Federal Street Chicago

Quick-Knick Your Car

Have a beautifully nickel plated car. Make her look just like a $5000.00 one. It's just as simple; you can do it all in the time it takes to polish brass, and then you're done. No more brass polishing.
Not a cheap silver or mercury wash, but a real permanent plate, that will wear as long as your car.
Remember: QUICK-KNICK does it. The only plater that is absolutely reliable.
Price $2.00 complete, at your dealer's or send to us.
Remember the name and insist upon QUICK-KNICK.

FOREST CITY SALES COMPANY
Dept. L, Fremont, Neb.

THE CLEARING HOUSE—(Continued)

A BUELL High-Duty Whistle

on your car will make you the envy of the town. Everybody who has one is more than pleased. Looks so good to car owners that anybody can make money selling them. Installed in 5 minutes, with wrench only. Blown on a new principle, giving it the power of a locomotive whistle. Our agencies are valuable. Write for circular and cut.

BUELL AUTO COMPANY
6051 Cottage Grove Avenue Chicago

Special Prices for 60 Days Only

Goodyear Dunlop Rings, '07, all sizes	$1.00 ea.
Goodyear Clincher Side Rings, '07, all sizes	1.00 ea.
Universal No. 2 Clincher side Rings, all sizes	.50 ea.
Goodyear Locking Rings, all sizes	.25 ea.
Universal No. 2 Locking Rings, all sizes	.25 ea.
Marsh Rim Locking Rings	.50 ea.
Continental Wedges, Combination Style.	.15 ea.
Continental Nuts (old type coarse threads)	.10 ea.
Continental Combination Wedges (old type)	.25 ea.
Continental Rims (new type), all sizes, also old style Continental Rims, Lugs, Extensions and Braces for same. Universal No. 2 Rims (slightly used), all sizes	$8.00 a set.

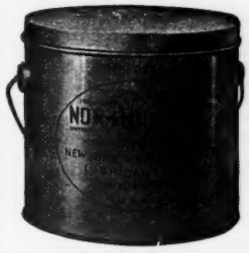
Kastner Tire & Rim Co.
2112 Michigan Ave. Chicago, Ill.

DEALERS!

Send for our new catalogue before buying accessories. We guarantee lowest prices consistent with quality.

M. M. Sales Company
READING, PA.

Economy is too big a matter to be found lurking in cheap prices.



TRADE MARK REGISTERED IN UNITED STATES PATENT OFFICE

NON-FLUID OIL

Costs more than other lubricants for bearings and gears but its use reveals true Economy in dollars saved on repairs and in Efficiency retained in your car.

NEW YORK & NEW JERSEY LUBRICANT CO.
165 Broadway, New York
Chicago, 1430 Michigan Ave. Philadelphia, 1431 Vine St.

B. A. Gramm's Motor Trucks

Newest Designs; Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.
Exclusive Motor Truck Builders
Lima, Ohio, U. S. A.

Stewart Speedometer

MAGNETIC PRINCIPLE

Approximately 450,000 cars will be built during 1913 and 400,000 of these will be equipped with a magnetic speedometer—like the Stewart.

The Stewart Speedometer Factory
1931 Diversey Blvd., Chicago, U. S. A.

Service stations in every important city in the world

AUTOMOBILE



SPRINGS

THE PERFECTION SPRING CO.
Cleveland Ohio

Detroit Trailers



2 Wheel 1200 lb. capacity
4 Wheel 5 ton capacity

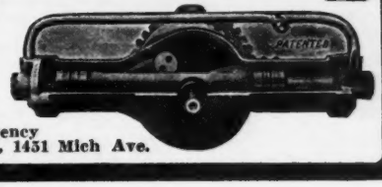
For Contractors, Grocerymen, Summer Residents, Laundries, Dry Goods Houses, etc. Can be attached to any car.

Let us send you our booklet *Choice territory open to dealers*

DETROIT TRAILER COMPANY
95 E. Woodbridge Street Detroit, Michigan

O-B GEAR DRIVEN AIR COMPRESSOR NO. 2

We guarantee this compressor to inflate a 36x4 tire in 90 seconds and other tires in proportionate time. It will compress air to 250 lbs. as easily as 10 lbs. It runs equally well placed in any position. It will last a lifetime, needs no attention, has very few moving parts, and is constructed on right principles, which are covered by patents. Piston rings and bevel seated valves used throughout. For inflating tires and operating air starting devices it has no equal. Can be installed on all leading cars—most factories will furnish them when requested.



UNIVERSAL MFG. CO.
308-10-12 9th St., So., Minneapolis, Minn.

Chicago Agency
Motor Car Supply Co., 1431 Mich Ave.

When Writing to Advertisers, Please Mention Motor Age.

CLASSIFIED ADVERTISEMENTS

The Trading Center of the Motor Car Industry — MOTOR AGE — Rates—25¢ per line Minimum Charge $1.00 6 words to a line

Cars For Sale

A 6-CYLINDER 1910 MODEL 5-PASSENGER touring car in first-class condition; 5 good tires, top, windshield, etc. Price $300. A genuine bargain. Come see it. F. E. Alford, Goshen, Ind.

AUTOMOBILES AND PARTS; LARGEST stock ever known.
Progress Brokerage Co.,
527 Grant St., Buffalo, N. Y.

A 6-CYL., 90 H. P. CAR WITH $500 WORTH OF EXTRA EQUIPMENT MUST BE DISPOSED OF AT ONCE. FOR FURTHER PARTICULARS, IF YOU ARE WILLING TO PAY $1,000, ADDRESS BOX D 428, C|O MOTOR AGE. H

CHEAP FOR CASH—FIVE PASSENGER touring car with windshield, top, curtains, good tires, lamps, good upholstering. Buyers fare deducted. Edgar Magee, Appleton City, Mo.

FAL CARS AND REPAIRS
F. A. L. Auto Co., 4052 Princeton Ave., Chicago. Phone Drover 1712.

FOR SALE CHEAP
One Twelve-passenger, sight-seeing car, Pullman body, in A-1 condition. Inquire of D. F. Poyer Company, Menominee, Mich.

FOR SALE—MODEL 0-0 WHITE Steamer in first-class shape, like new. T. M. Smith, 1969 Montrose Blvd., Chicago, Ill.

FOR SALE—ONE 1913, SEVEN-PASSENGER Big Six Lozier, used as demonstrator. run less than 5,000 miles; factory overhauled and repainted; looks as good as new; two spare tires, four spare rims; for $4,000.
Louisville Lozier Company,
405 West Broadway, Louisville, Ky.

FOR SALE—WHITE STEAM CARS; VARIOUS models, in excellent condition; also parts for steamer engines and generators. We specialize in steamers. Joseph Libal, 3145-53 N. Halsted St., Chicago.

FOR SALE—1910 7-PAS. 50-H. P. KISSELKAR. Has 5 good casings. Factory overhauled; $600.00 takes the car. Must be seen to be appreciated. Stewart Garage, Delavan, Wis.

FOR SALE—10 "ATLAS" TAXICABS IN running condition at $300 each. Splendid opportunity for some one wishing to start in this money-making business, requiring but a small investment. Dan Condon, 2635 Wabash Ave., Chicago.

G. J. G. — SPECIAL RACING MACHINE capable of doing better than 70 miles per hour mounted on English style of wire wheels with Bosch racing magneto and motor modeled so as to have the minimum of friction to the maximum of speed. Equipped with New any make selected of standard tire equipment. Write for Photograph and specifications to G. J. G. Motor Car Company, White Plains, N. Y.

KNOX 5 PASSENGER MODEL "R" 1910 touring car. 5 new casings, car equal to new, run 7,000 miles. For quick sale will take $1275.00. Yeggy-Don Sales Co., Rock Island, Ill.

LIMOUSINE BODY FOR SALE AT HALF price. To fit Packard 1912 to 1908 chassis. Fine interior driven, fore door body, just put into first-class condition, good as new. Seats seven with folding seats to slide under rear seat. Burrowes Rustless Screen Co., Portland, Maine.

LOCOMOBILE, 1911, 5-PASSENGER. RUN less than 6,000 miles; newly painted; cost $3,800 with equipment; price for quick sale $1,450. Address owner, Box 44, Dwight, Ill. s

MITCHELLS, REBUILT, GUARANTEED. These cars are fully equipped. Call or write for further particulars.
Mitchell Automobile Co.,
2334-36-38 Michigan Ave., Chicago.

REO TOURING CAR, 1909, $200.00. NEED the money. H. Carlin, Winona, Minn.

SOME REAL BARGAINS FOR YOU.
One Lambert 30-h. p. roadster.....$250.00
One Studebaker electric..... 350.00
One Brush runabout..... 90.00
And others at proportionate prices; write for list.
American Auto Sales Co., Oshkosh, Wis.

THOMAS TAXI CAB.
FOR SALE—GOOD CONDITION. EQUIPPED WITH BOSCH MAGNETO AND STROMBERG CARBURETER $275.00. ALSO A TAXI CAB BODY LIKE NEW $75.00.
J. DOLAN,
1153 WABASH AVE., CHICAGO.

THOMAS FLYER RUNABOUT 4-60—IN excellent condition. Must sell to settle estate. Will sacrifice if taken immediately.
E. R. M., 11 No. Harrison St.,
East Orange, N. J.



A Good Reason

"We do not care to repeat the advertisement in reference to the Knight car at this time. We sold it through the MOTOR AGE advertisement. That's why."
H. H. W.

THOMAS FLYER RUNABOUT 4-60—WILL sacrifice for cash. Buying touring car.
H. C. Levin,
2160 Broadway, New York.

TOURING CAR FOR SALE—1912 PAIGE-Detroit; first-class; same as new; extra casing for inner tubes, chains; complete, 1913 top; money needed; bargain; will make terms; 363 N. Boyle, phone Lindell 2682, St. Louis, Mo. k

WILL SACRIFICE ONE CRAWFORD, TWO Mercers, two Darracq Taxicabs.
Trenton Taxicab Company,
Trenton, N. J.

1913 LOZIER SEVEN-PASSENGER BIG Six with self starter and full equipment. Car is practically brand new and has new tires all around. Price $3,600.00.
ARCHAMBAULT MOTOR SALES CO.,
197 Ogden Ave., Milwaukee, Wis.

Parts and Accessories
FOR SALE

A BARGAIN; STORAGE BATTERIES, 6-80 and 6-160; guaranteed; all makes, new and used, $3.50 to $10 for short time only. 4105-7 Cottage Grove Ave., Chicago. a

A BIG CARLOAD OF RIMS RECEIVED— Continental Demountable, old type; Continental Demountable, new type; wedges, nuts and bolts for all makes of United Rim Co. rims. We are the Largest Individual Dealers in rims and rim parts in the United States. State size rim when ordering rims or parts. Circular on request.
Kastner Tire & Rim Co.,
2112 Michigan Ave., Chicago.

ATTENTION—HENRY OWNERS

Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars.
Muskegon Automobile Co.,
Muskegon, Mich.

AUTOMATIC SPEEDER AND PRIMER. Every car owner should have one, saves 25% on gasoline, starts motor with first turn of crank. The most rapid selling automobile device on the market. Agents wanted. Price, $7.50 f. o. b. Frankfort. Automatic Device Co., 551 E. Jefferson St., Frankfort, Ind.

A WHITE STEAMER GENERATOR AND burner, almost new. Will sell cheap. Address Box D 245, c|o Motor Age.

BALL & ROLLER BEARINGS
All Types and Sizes.
We also repair or exchange all makes of ball bearings.
THE GWILLIAM CO., 253 W. 58th St., N. Y.
1314 Arch Street, Philadelphia.

AUTO OWNERS IN SMALL TOWNS.

You can save one-half your tire expense and nearly all your tire trouble by using Security Reliners. Many of our customers run their cars the entire season without blowout or puncture and without spending a cent for tire repairs.

YOU CAN DO IT YOURSELF.

If we have no dealer in your town you can get a trial order at the dealer's price, and make a good profit selling to your neighbors. If you run your own car write at once for our plan.

SECURITY RELINER CO.,
301 Spring St., Montgomery, N. Y.
248 W. 54th St., New York.

BARGAINS.
Schebler Carburetors, slightly used: Model L 1¼", $7.50; Model L 1", $6.75; Model O 1¼", $8.50. Same carburetors, brand new, $9.50, $8.50 and $11.50, respectively. Gas Headlights, 10" front, enameled black and nickel, finest lamps made; worth $20.00 pair, our price $9.50 per pair. Brass Windshields, genuine plate glass, complete with fittings and filler board, 41" wide, $8.50. New 4-cyl. Jacobs-Brandow coils, kick switch, $11.50; Disco self-starters, 4-cyl., $5.00. Other bargains. Get our bulletin. Automobile Appliance Co., 1712 Michigan Ave., Chicago, Ill.

COMPLETE "VULCAN" WELDING plants (Oxy-acetylene Process) are made in sizes from the special garage No. 1 with two 100 cubic feet oxygen drums (sold, not rented) filled with gas, at $175.00, up to the largest sizes used. Torch is about half the weight of the average one and does not back-fire. Acetylene generator has no springs, clockwork or similar device, but automatically as fast as gas is used it is made.
Write us today for our booklet and special information on welding.
VULCAN PROCESS CO.
Factory and Office: 25th and University Ave. S. E., Minneapolis, Minn.

BARGAINS—BARGAINS—BARGAINS.

Is the only thing we handle, from a cotter pin to a complete car. Small and high-powered cars, Engines, Frames, Bodies, Axles, Radiators, Transmissions, Magnetos, Tops, etc. Before buying let us quote.

Pacific Motor Car Exchange Company,
10 West 62nd St., New York.

BERGDOLL REPAIR PARTS

The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.

Louis J. Bergdoll Motor Co.,
124 N. 3rd St., Philadelphia, Pa.

CUT-OUTS

E.M.F., Flanders, Buick, Regal, etc. Complete outfit with brass lock, open pedal, $1.50. Lincoln Machine Shop, Lincoln, Ill.

DRAGON REPAIR PARTS

We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

ELECTRIC HORNS, $2.90; BUMPERS, $3.00. Write for our bargain sheet. Fred Allen Automobile Supply Co., 1610 S. Michigan Ave., Chicago, Ill.

FORD AGENTS—WE MAKE A SPECIALTY of Dust Hoods to cover top when clashed down, for Model T Ford 1910-1911-1912-1913 cars. Write for prices. Will save you money. The H. A. Hawes Storm Front Co., Coldwater, Mich.

FORD FAN BELTS, WOVEN COTTON AND silk; outlasts six regular bolts. Postpaid, 60c. Dealers, write. Angier's, Streator, Ill.

FORD LIGHTING OUTFIT $5.50

Includes parabolic reflectors, tungsten bulbs, wiring switch and free delivery. Truscott Auto Supply Co., St. Joseph, Mich.

FORD OWNERS AND DEALERS!

You will save trouble and money by installing our timer elevating device.

Ford Parts Specialty Co.,
1211 Main St., Richmond, Ind.

FORD OWNERS—WE CAN MAKE YOUR car the easiest rider made with light or heavy load; no jolts, no jars, no upthrow. Write us. Thomas Auxiliary Spring Co., Canisteo, N. Y.

FORD OWNERS—OUR SPARE DEMOUNT-able wheel cures tire trouble on road. Doctors, attention. Write Angier's, Streator, Ill.

FORD OWNERS: THE BLACKBURN Autolock Switch offers you Certain-Teed Theft Insurance. Yale key for plug. Price $5.00. Money-Back Guarantee. At your dealer or Blackburn Specialty Co., 1134 Prospect Ave., Cleveland, Ohio.

FORD, HUPP AND MAXWELL

Muffler cut-out, machined ready to attach, including lock, open pedal string and cables, $1.35. Lincoln Machine Shop, Lincoln, Ill. c

FORD T. OWNERS

Foot throttle or accelerators, $1.50. Lincoln Machine Shop, Lincoln, Ill.

FOR SALE.

1 35 H P Northway motor	$125.00
Model D 4 Bosch Magneto	30.00
B No. 3 Stromberg Carb, new	8.00

Auto Salvage Co.,
1436 Wabash Ave., Chicago.

FOR SALE—ONE VULCANIZING POT AND boiler, almost new; will sacrifice for $175; worth $300. Colonial Rubber Works, 46-52 E. 28th St., Chicago.

FOR SALE — PACKARD 7-PASSENGER body, top, windshield, seat, covers, all Packard standard. Body has foredoors; paint in fine shape, and is suitable for 1910, 1911 or 1912 Packard "30." $350.00 takes complete outfit. Address Box 252, Uniontown, Pa. d

"GET BUSY SALE!"

Large automobile factory purchased outright! Everything at a price! Must move at once! Axles—Radiators—Steering Gears—Magnetos—etc. Anything and everything! Send for bargain list.

Puritan Machine Company,
413 Lafayette Blvd.,
Detroit, Mich.

FORE DOORS

AT

CUT PRICES.

To reduce stock we are offering big reductions on all our standard Fore-Doors. Write today and secure a bargain while they last.

Address Dept. A,
Auto Specialty Manufacturing Co.,
Indianapolis, Ind.

GUARANTEED RADIATORS

For all cars. The following is our stock list of radiators for the cars mentioned, subject to immediate shipment. Compare our prices with other lists.

Ford Model "T"	$18.00
Buick 10-32-33-14	27.50
Buick F-16-17-19-26-27-28	35.00
Buick 38-39	42.50
Hudson 20	33.00
Chalmers F-40	30.00
Lion 40	25.00
Warren 40	28.50
E-M-F 30	30.00
Flanders 20	30.00
Brush A-B	17.00
Anhut	15.00
Northern C	32.00
Wayne 30	35.00
Special 40 H. P.	15.00

Terms: One-third cash with order, balance with order.

When ordering state year.

AUTOPARTS MANUFACTURING CO.,
453 Trombly Avenue Detroit, Mich.



More Than Satisfied

"Please change our advertisement to read as per enclosed matter. Run until further notice. We have steadily secured excellent results from our ads in MOTOR AGE and are more than satisfied."

L. D. S.

GUARANTEED BATTERIES.

6 volt	140 Amperes	$16.00
6 volt	80 Amperes	13.00
6 volt	60 Amperes	10.00

The Ampvo Battery Co.,
1607 Michigan Ave., Chicago, Ill.

GUARANTEED ELECTRIC HORNS, MADE by well-known manufacturer. Regular price $8. Our price $5. F. E. Alford, Goshen, Ind.

IF INTERESTED IN A REAL SHOCK AB-sorber that will really make your car ride easily and save you tire and car expense, write the Blackledge Mfg. Co., 2112 Michigan Ave., Chicago, for printed matter.

KEROSENE FOR AUTOMOBILES

Our new Model B uses successfully half and half mixture lowest grades kerosene and gasoline. Satisfaction guaranteed or money refunded. Greatly increased power; very slow speed on high. Starts easy at zero. Special agents' prices. Dept. B.

The Air-Friction Carburetor Co.,
Dayton, Ohio.

LANDAULET BODY

For any Straight sill. This body is in A No. 1 condition and will prove a bargain to the first purchaser.

Modern Autop Co.,
607 St. Claire Ave. N. E., Cleveland, Ohio.

LAUGH AT TIRE TROUBLE

Use Standard Tire Protectors. Tire expense reduced two-thirds. Write today for our valuable accessory catalogue.

New York & Brooklyn Auto Supply Co.,

1717-1719 Broadway, New York.

LUBRICATE YOUR SPRINGS AND GET some riding comfort. When they become rusty and set they are like solid bars. The (TOWNSAN) Spring Lubricator is a finely finished flat-jawed tool for wedging the leaves apart, permitting lubricant to be inserted between. A tool for mechanics or thoughtful car owners. Price, postpaid, $1,50. Townsan Auto Spec. Co., Mitchell, S.D.

LATEST FORD ROADSTER BODY, $35. Tops, curtains included. MacInnis Bros., Toledo, O.

LION REPAIR PARTS

We have on hand a complete stock of repair parts for all models of Lion Cars.

Lion Motor Parts Co.,
124 N. 3rd St., Philadelphia, Pa.

MACHINE SHOPS AND GARAGE—OUR WELD IT ALL machines will weld perfectly any broken casting that has a melting point. Full particulars on Oxy-Acetylene welding machines sent on receipt of your address. Every machine fully guaranteed. H. D. Prose & Co., Wichita, Kansas.

MAGNETOS: WE HAVE 2,000 MODEL X

Splitdorf Magnetos, new. Price, without coil, $17.50 each; with coil, $25.00 each.

The regular price of these is $75.00.

We also have other makes of magnetos at cut prices, in fact everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money-saver in the world.

TIMES SQUARE AUTO CO.,
1210 Michigan Blvd., Chicago, Ill.
S. W. Cor. 56th St. & Broadway, N. Y. City.

MR. (FORD) OWNER AND GARAGE MAN

The Townsan Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price $1.50 by mail. Ask your jobber, or address Townsan Auto Specialty Co., Mitchell, S. D.

MORA REPAIR PARTS

We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

NEW FOREDOOR 5-PASS. BODIES,

trimmed and painted	$75.00
5-pass. metal bodies, unfinished	10.00
Splitdorf spark plugs, per four	1.60
Stamwood steel running boards, 9½"x 48"	1.00

Martindale & Millikan, Franklin, Ind.

ONE MODEL 121 SPECIAL BOWSER GAS Wheel Tank for sale.

North Iowa Motor Sales Co.,
Mason City, Iowa.

OUR AD IN THE CLEARING HOUSE SEC-tion will interest every owner of brass trimmed cars. Just turn to page 110 and look it over, we know it will interest you. Look for the name QUICK-KNICK.

Forest City Sales Co., Fremont, Nebr.

OXY - ACETYLINE WELDING PLANTS, $65.00 to $175.00; send for circular.

Victor St. John,
Fairmont, Minn.

OXY-ACETYLENE WELDING AND CUT-ting Machine. The Admiral Welding Machine is built by men who know; large capacity; self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, $250.

We do expert welding; prices right.
Admiral Welding Machine Co.,
1331 Walnut St., Kansas City, Mo.

SCHEBLER MODEL "L" CARBURETORS, new, 1¼ or 1½-inch, $8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

SEAT COVERS FOR ALL CARS—SPECIAL price on Fords. We clean old covers; make them look like new. Auto Cape Top Co., 2334 Michigan Ave., Chicago.

RADIATORS
To order for all cars.
We use copper fins and tubes.
You can buy brass cheaper, but the cooling efficiency is not there.
Black enamel, baked finish, $2.00 extra.
Terms cash with order, or one-third deposit with C. O. D. shipments.
$5.00 Trade Allowance for old radiator shipped in F. O. B. Detroit.

Ford Model T	$22.00
Ford Model R. S. & N	28.00
Hupmobile 1910-1911	28.00
Hupmobile 1912-13	38.00
Warren 1910-1911-1912	35.00
Packards to sample, $50 to	65.00
E. M. F. 30	35.00
Flanders 20	30.00
Patterson 30	35.00
Buick 10-14-32-33	30.00
Buick 16-17-19-26-27-28	35.00
Hudson 20	32.00
Hudson 33	40.00
Cadillac 30	35.00
Paige 1910-1911	28.00
Paige 1912	30.00
DeTamble 1910—a few	15.00
Bullet Electric Lamps, per pair	12.00
Prest-O-Lite covers, doz	4.50
12x34 round gasoline tanks, each	3.00
28x13x8 square gasoline tanks, each	3.00
14-inch round to specification	10.00
16-inch round to specification	11.00
18-inch round to specification	12.00

Last three with 3½-in. filler with hex or horned cap.

17-in. Niagara folder, cost $19	10.00
30x2 tinners' rolls, cost $20	12.00

HURON RADIATOR & LAMP COMPANY,
253-255 Jefferson Ave., Detroit, Mich.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T	$16
Buick Model 10	22
Buick Model F	25
Chalmers-Detroit	20
Everett	20
Stoddard-Dayton	25

Any other make required at equally low prices.

Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

TOPS BUILT, RECOVERED AND REPAIRED.
C. G. Meyer & Son, Tiffin, Ohio.

TOURING, ROADSTER, RACING BODIES.
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.
Auto Sheet Metal Works,
1534 Michigan Ave., Chicago.

UNION OXY CARBIDE CO.
Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield Sts., Brooklyn, N. Y.

WE NOW HAVE BUT A FEW 30-35 AND 35-40 H. P. motors ready for shipment. Complete with magneto, coil and clutch. F. E. Alford, Goshen, Ind.

WRITE THE GUN METAL FINISH CO., 313 Powers Blk., Decatur, Ill., for free samples of ELECTRO-KNICKEL POWDER, for plating automobile trimmings. Will put on as heavy a coat of metal as an electroplating bath.

4 CYL. H. T. MAGNETOS, NEW	$ 30.00
Shaft Drive Planetary Transmission	10.00
Shaft Drive Rear Axles	40.00
Sliding Gear Transmissions	35.00
4 Cyl. 4x5 Motors	100.00
Holley Carburetors, 1¼"	4.00
Kingston Carburetors, 1"	4.00
34x4 Wheels, Q. D. Rims, per set	8.00
4 Cyl. New Air Cooled Motor Spl	65.00
5 Passenger Mohair Tops, Rambler	25.00
7 Passenger Mohair Tops, Rambler	28.00
40 H. P. Radiators	20.00
Fore Door Bodies, 32½x77½	55.00
All Brass Windshields, 41"	8.00

Reduced prices on guaranteed tubes.
Auto Parts Co.,
513 W. Jackson Blvd., Chicago.

50 NEW PRESSED STEEL FRAMES 163" long, 34" wide. Each $10.00. Send for sketch.
Lucas & Son, Bridgeport, Conn.

$690.00+$3.00.
You pay $690.00 for your Ford and take the risk of it being stolen. Crankblock costs $3.00 and safeguards your car.
H. C. Fairchild, Mfg., Maplewood, N. J.

Cars Wanted

FOR SALE OR TRADE — OKLAHOMA farm for a car. 160 acres nice level land, best of soil, all fenced and comfortable house in a good farming country. No incumbrance and title good at $20.00 per acre. No less. Will take a car as part payment if in good running order and priced right. Don't write, but come and see. Reference, the Bank of Texline. A. L. Stone, Texline, Tex.

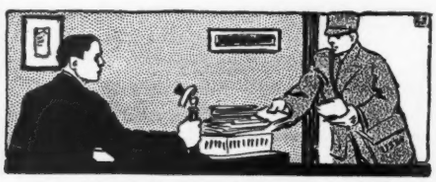
TO TRADE—GOOD OKLAHOMA LAND for slightly used 5 passenger cars. The land is honestly rated and auto must be just as represented. Address E. A. Macy, Knowles Garage, Knowles, Okla.

WANTED—A MERCER RACY ROADSTER. Condition no object if price is right. Address Box D 436, c|o Motor Age. a

Parts and Accessories WANTED

MAGNETOS WANTED:

Will Pay Cash for New or Used Magnetos.
Pellet's Magneto Exchange,
1463 Michigan Ave., Chicago.



Positions Filled

"I have filled the positions referred to, and have received numerous applications, so discontinue the ad. Rest assured that when we need additional salesmen, we will take pleasure in giving you the advertisement." E. H. C.

WANTED—PREST-O-LITE TANKS. WE pay the following prices:

A. Presto Tanks (large)	$9.00
B. Presto Tanks (medium)	7.50
E. Presto Tanks (small)	6.00

Ship in any quantity C. O. D. or S. D. B. L.
ERWIN GREER & COMPANY,
1456-64 Wabash Ave., Chicago, Ill.

WANTED—REAR AXLE AND TRANSMISsion combined for 40-h. p. touring car; must be in first class condition and cheap. Glass Bros., St. Marys, Pa.

WANTED — SMALL SECOND-HAND power air compressor; cheap; must be in good working order for private garage. C. A. Appley, Libertyville, Ill.

For Sale or Exchange

TO TRADE—1 4-CYLINDER WINTON Roadster in good running shape for 5 pass. White Steamer. Auto Repair Shop, Paulding, O.

Situations Wanted

AUTOMOBILE BODY DRAFTSMAN OPEN for position with reliable firm. Have had over ten years' experience. Now employed, but desire to make a change. Very best of references furnished. Address Box D 429, c|o Motor Age. v

CAR OWNER WISHES POSITION AS chauffeur in private family in Southern Ohio or Indiana preferably. State salary. Address Box D 450, c|o Motor Age. b

BRANCH MANAGER—SALES MANAGER.

Highly competent executive, experienced organizer and sales producer, thoroughly conversant with trade conditions, desires new connections as branch manager or factory sales manager. Has held present position as branch manager for two years with a record of 60% increase in sales during current season. Best of reasons for desiring change. For full particulars address

Box D 451, c|o Motor Age. b

FOREMAN TRIMMER, WHO HAS HAD 10 years' experience as foreman trimmer in large automobile factories, open for position. Box D 449, c|o Motor Age. s

GARAGE MANAGER AND SALESMAN OF wide experience desires to communicate with parties relative to assuming charge of garage in small city. Box D 407, c|o Motor Age. m

MR. MANUFACTURER—ARE YOU SATISfied with the results you are now getting in the South? If not, let a live wire, result getting man talk with you. I have worked the South for ten years, in the automobile business, was district manager for one of Detroit's largest builders, and of late I have been branch manager in one of the largest cities in the South. I have a wide acquaintance of the trade and conditions. Address Box 440, c|o Motor Age. b

POSITION WANTED BY AN EXPErienced mechanic and driver, with some northern owner of a high-grade automobile, as chauffeur during the summer and fall; absolutely sober and reliable; for further particulars address Box D 447, c|o Motor Age. r

POSITION WANTED BY EXPERIENCED automobile repairer, demonstrator and foreman; must be steady and good salary; can furnish best of recommendation; now employed; would like to make a change. Address Box D 415, c|o Motor Age. a

SALESMAN, 5 YEARS EXPERIENCE, DEsires position with large Ford agency. Will buy own demonstrator. Com. or com. and salary. Address Box D 441, c|o Motor Age. l

SUCCESSFUL CHIEF ENGINEER IS NOW open for a proposition either as chief engineer or factory manager of pleasure car or light truck concern. Is a man of broad practical experience and can produce efficiently. Address Box D 454, c|o Motor Age. d

WANTED—POSITION AS CHAUFFEUR IN private family. Good references. Can do all repairs. Now working in repair garage. Address Box D 456, c|o Motor Age. p

WANTED — POSITION AS PRIVATE chauffeur. Good references. State make of car and wages. Would prefer Iowa, Minnesota or Wisconsin. Address box D 439, c|o Motor Age. p

Help Wanted

ENGINEERS, SUPERINTENDENTS, Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—20th Year—Chicago.

SALESMEN—TO CALL ON CAR OWNERS in the city of Chicago to explain CHEMICAL RUBBER (SYNTHETIC RUBBER) THE PERFECT TIRE FILLER.
1339 Michigan Avenue, Chicago,
Chas. Weichselbaum, Sales Manager.

SALESMAN WANTED — EXPERIENCED electric automobile salesman. Give experience, salary, expected and references. Address Box D 457, c|o Motor Age. t

WANTED—A FIRST-CLASS FIELD MAN for Motor Trucks. Must show a record for producing business and give reference in first letter. All communications confidential. Address Box D 398, c|o Motor Age. d

60 HIGH GRADE MEN WANTED
For all lines of the automobile industry. The Toledo Engineering Agency, Toledo, O. H. L. Croy, M. E., Mgr. Member S. A. E.

Agency Wanted

WANTED—ACCESSORIES AGENCY FOR Southern California; have agency for new car. Mail catalog, prices, discounts. Geo. Lawrence, 50 Regular, Detroit, Mich.

Wanted—Agents

AGENTS WANTED—TO SELL THE AUtohavit, guaranteed to save 25% of gasoline on any automobile, large profit, quick sales. Autohavit Sales Co., 1315 C. Old Colony Bldg., Chicago, Ill.

RESPONSIBLE SALES AGENTS WILL find the Hartford Electric Starting and Lighting System an easy selling proposition. Territory now being assigned. Particulars on request. Hartford Suspension Co., 156 Bay St., Jersey City, N. J.

Business Opportunities

FOR SALE—AUTO REPAIR AND SUPPLY business, the best equipped shop in So. West Texas, doing a fine business; about 125 miles from San Antonio and 40 miles from the Gulf, in very prosperous town of 7,500. Price $4,500.00. Address Box D 453, c|o Motor Age. d

FOR SALE—BEST EQUIPPED GARAGE with machine shop in Michigan in town of 7,000 or more, doing large business the year around. Address Box D 455, c|o Motor Age. v

FOR SALE—GARAGE AND BICYCLE business. Will invoice about $2,500. One other garage with 125 cars to draw from. An excellent chance for a small capital to make big interest. At the junction of two of the best touring routes in Michigan. Address Box D 442, c|o Motor Age. r

FOR SALE—IN NORTHERN ILL., GOOD equipped auto and tire repair shop; fine location, plenty of work, lots of cars and an A1 place for a good repairman. Reason for selling, wish to go west. For full particulars address Box D 452, c|o Motor Age. f

FOR SALE—THE ONLY EXCLUSIVE AUtomobile and tire repair garage in central Iowa city of twenty thousand. Do good business in supplies, livery and storage. Business invoice about twelve hundred dollars. Address Box D 430, c|o Motor Age. b

FOR SALE—WELL ESTABLISHED AND paying garage business in city of fifty thousand people. Best location in city. Large floor space; northern Illinois; must sell on account of health. Address Box D 444, c|o Motor Age. w

GARAGE AND REPAIR SHOP, MACHINE shop in connection, together or separate. Fine, well established business opportunity. Much traveled section of central Wisconsin. Your first letter will bring full particulars. Box D 403, c|o Motor Age. g

Tires

ENGLEBERT TYRES.
Made in Belgium.
Standard in all sizes. Guaranteed 4,000 miles.
New and Second-Hand Tires at a Great Reduction.
Send for Circular on Repair Work.
Colonial Rubber Works,
46-52 E. 28th St., Chicago.

NON-SKID TIRES.
All standard makes at the following prices:

Size	Price	Size	Price
30x3½	$14.50	34x4½	$27.00
32x3½	16.00	35x4½	28.00
32x4	20.00	36x4½	29.00
34x4	22.50	36x5	31.50
36x4	24.50	37x5	32.50

I do not carry any but standard make tires or deal in inferior brands. I will ship any size tire listed above to any part of the U. S. upon receipt of 10% of order, balance C. O. D.

M. C. MORAN,
334 Amsterdam Ave., New York City.

TIRES
New and Slightly Used Tires Far above the average. Our success has demonstrated that our goods are right and a trial will convince you. Send for circular NOW.

Serlin Tire Co.,
1073 14th Pl., Chicago.

TIRES.
We are the largest jobbers in Tubes and Tires at Cut Rate Prices.
All Fresh Goods. A few special bargains:

Size.	Casings.	Tubes.
30 x 3	$ 7.65	$2.35
30 x 3½	11.00	3.20
32 x 3½	12.00	3.35
34 x 3½	12.90	3.55
33 x 4	16.00	4.60
34 x 4	17.25	4.65
35 x 4	17.50	4.80
36 x 4½	21.50	6.25

Other sizes in proportion.
Send 10% for express charges, bal. C. O. D. Allow Examination.
MANUFACTURERS AUTO TIRE CO.,
1427 Michigan Ave., Chicago.

TIRES TIRES
I will sell you good wrapped tread clincher tires cheaper than any one in the United States. New 1913 stock. 34x4 Case, $14, all other prices accordingly. Write for prices.
D. Ogden,
Columbus, Ind.

Magnetos

MAGNETOS
Repaired, remagnetized; prompt service on all makes.
Get our exchange proposition on new K-W for old equipment.
Spark Coil, Storage Battery and Carburetor Repairs.
Northwestern Distributors.
K-W magnetos, Schebler carburetors, Vesta lighting equipments.
Kellogg Self Starters and Tire Inflators.
Reinhard Brothers Co.,
Minneapolis, Minn.



Good Results

"Enclosed find check in payment for advertising in MOTOR AGE, two insertions. We have had good results from this ad and you will herewith find enclosed copy for six more insertions." A. H. Y.

Portable Garages

CHICAGO PORTABLE GARAGE CO.,
Makers of the "better kind" of portable garages at popular prices.
They are simple to erect, are durable, and possess a style of exclusiveness.
Full particulars concerning material, sizes and prices mailed for the asking. Why not write now?
812 Sacramento Blvd.,
Chicago, Ill.

PINYOUN'S PORTABLE GARAGES.
Built to last.
These are not light, flimsy structures, but solid, substantial, stylish garages that are guaranteed to give years of service & satisfaction. Descriptive literature for the asking.
F. C. Pinyoun & Son,
2530 Carnegie Ave., Cleveland, Ohio.

Rebuilding and Repairing

AUTOMOBILE REPAIRING OF THE highest class at prices that are fair to both parties has made possible our reputation for reliability. Estimates cheerfully furnished. Barrett Automobile Repair, 150 E. Indiana St., Chicago. Phones: North 7571, Automatic 43-482.

AUTOMOBILE CYLINDERS REGROUND, new pistons and rings fitted. Garage Air Compressors. Cast Iron Brazing Co., Manchester, N. H.

CYLINDERS REGROUND AND FITTED with new pistons and rings for $7 to $11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. The Crown Machine Shop, Crown Point, Ind.

CYLINDERS REGROUND, NEW PISTONS

and rings fitted, gear cutting, of all kinds and materials, transmission and bevel gears, piston pins and push rods of chrome nickel steel, hardened, tempered and ground; guaranteed better than factory; old piston pins reground and fitted to your new pistons; old push rods reground and furnished with new guides, crank shafts, connecting rods, valves, crank cases, any part for your auto or motor reproduced same as original but better; phosphor bronze bushings carried in stock. Send old or broken parts to go by. The shop of quality.

McCadden Machine Works,

St. Cloud, Minn.

CYLINDERS REGROUND
and fitted with new pistons and rings for $15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description. The Adapt Machinery Co., 1624 Wabash Ave., Chicago, Ill.

THE FIXIT WINDSHIELD CO.
Expert repairers and reglassing of all kinds. All work guaranteed. A trial will convince you. 1919 S. Wabash Ave., Chicago. Phone Calumet 4583.

Auto Tire Repairing

EXPERT VULCANIZING GUARANTEED.
Our low prices and quick deliveries have made us famous. Ask for our list of used tires.
Reinsberg Auto Tire & Supply Co.,
1239 Michigan Ave., Chicago.

Radiator and Lamp Repairing

A-A-A RADIATORS MANUFACTURED and repaired. Radiators of any make repaired and returned same day. We can make any style radiator and ship in three days.
Sheppard Co.,
1331 Jackson Blvd., Chicago.

AA1 AUTO LAMP REPAIRING
All Radiators Repaired
by expert workmen.
All work guaranteed by the
Michaud Metal Works, 1615 Wabash Ave., Chicago. Tel. Cal. 5286; Auto 67-337.

ALL KINDS OF AUTO RADIATORS, hoods, fenders, lamps and windshields, etc., rebuilt and repaired. All work guaranteed. Also general sheet metal work. Phone or mail order. L. Blumenfeld & Co., 1919 Wabash Ave., Chicago. Tel. Cal. 4583.

ARROW RADIATOR REPAIR CO.,
1331 Wabash Ave., Chicago.
Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans. We guarantee all our work. Phone Cal. 1995.

CHICAGO MANUFACTURING COMPANY,
1466 Michigan Ave., Chicago.
Manufacturers of Radiators, Hoods, Fenders and Tanks. New Cores placed in old radiators. First-class repairing. All work guaranteed.

ILLINOIS AUTO SHEET METAL WORKS, 58-60 E. 16th St., Chicago, Ill. Manufacturers and repairers of Radiators, Hoods, Fenders, Tanks, etc. Cores built in old radiators. We do expert repairing, at lowest price. Calumet 1191.

ONLY RADIATOR FACTORY IN NORTHwest. Eleven years' knowing how. Why send your Radiator down East when you can ship it to us; save Time, Express, Freight, Money, and get best workmanship. Prices right. Make new Radiators; allow for old one.
Todd Manufacturing Co.,
820-822-824 Mary Pl., Minneapolis, Minn.

THE M. & L. AUTO SHEET METAL Works rebuild and repair radiators, hoods, fenders, tanks, lamps, etc.
1551 Michigan Ave., Chicago, Ill.
Tel. Cal. 2348.

Welding

AMERICAN WELDING CO.,
2637 Michigan Ave., Chicago.
Autogenous welding of all metals, such as crankcases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

BRAZING AND WELDING CO. of Chicago.
All metals brazed and welded are guaranteed. Experts in aluminum welding. Send for circular on aluminum welding. 1615 Wabash Ave. Tel. Calumet 5286.

BROKEN CRANKSHAFTS, CRANKCASES, cylinders, flywheels, gearteeth, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet. Atlas Welding Works, Rahway, N. J.

THE WELDING COMPANY

Springfield - Boston - Hartford - Holyoke-Bridgeport. Aluminum cases and cast iron cylinders a specialty. Five shops with five years' successful experience.
Ask for our printed guarantee.

WELDING—CYLINDER CRANKCASE AND Crankshaft Welded. Cylinders rebored. $7.00 to $11.00 a cylinder, including piston, 8 rings. Sterling Engine Company, 331-333 S. Clinton St., Chicago, Ill.

WELDING
Cast iron, aluminum and all metals.
National Welding & Mfg. Co., Inc.,
523 Jackson Blvd., Chicago, Ill.

WE WELD AND ABSOLUTELY Guarantee our welds to hold, cylinders (cracked in or outside), crankshafts, aluminum crankcases, transmission cases, housings, etc., by the Oxweld process of welding and cutting metals.
Estimates furnished for job or repair welding and cutting operations of all kinds. Oxweld Acetylene Co., 37th St. and Jasper Pl., Chicago, Ill. Downtown receiving station, 557-561 W. Jackson Blvd.

Patent Attorneys

ATTENTION—PATENT YOUR INVENtion. Free search and opinion. Send for inventor's Primer free. Milo B. Stevens & Co., 312 S. Dearborn St., Chicago. Established 1864. Main office, Washington.

C. L. PARKER, PATENT ATTORNEY, Formerly member Examining Corps, U. S. Patent Office, 960 G St., Washington, D. C. Pamphlet of instruction sent upon request.

Automobile Schools

AA1 IS HOW OUR STUDENTS STAND with auto owners. Our school is the oldest, best equipped, most practical and successful in America. Write, phone or call for particulars. Auto School of America, Dept. M, 1600 Mich. Ave., Chicago. Tel. 1088 Cal.

ACADEMY OF AUTOMOBILE ENGINEERing—$35 pays for complete unlimited course on automobiles. Actual repair work and road lessons daily. Best equipped school and shop in Chicago. Evening classes also. Call or write, 1454 S. Michigan Ave., Chicago.

GREER COLLEGE OF MOTORING
Opposite Coliseum, 1459 Wabash Ave., Chicago. A practical education; 100 automobiles, 2 entire floors, 8 instructors; day and evening classes. Free booklet. Phone Calumet 327.

BE AN AUTO MACHINIST
There's a big demand for automobile machinists and for men to do repair work in garages. Pay is good. Automobile Machinists' Course—In 48 weeks we teach you all about automobiles and make you a machinist. Chauffeurs' Course—in 12 weeks we teach you to drive and repair any car and to take charge of garage.

HIGHLAND PARK COLLEGE
has the largest garage and machine shops in the country. Students work in shops from three to eight hours a day. Tuition and living expenses remarkably low. No entrance examinations. Send for catalogue. George P. Magill, President, Des Moines, Ia.

RELIABLE AUTOMOBILE SCHOOL.
If you only want to learn to drive a car or to take a car to pieces or to clean up dirty parts, don't come to my school.
But if you want to learn the Automobile Construction in all its phases thoroughly, then come to the Reliable School.
THE F. E. EDWARDS' AUTOMOBILE SCHOOL,
1427 Wabash Ave., Chicago.



Replies from all over the World

An advertiser in our classified columns writes, "We get inquiries from France, Austria, China, Panama and Canada."

What we get for others we can get for you. Try us out.

Automobile Books and Maps for Motorists

A. L. DYKE'S AUTO INSTRUCTION—A new idea of instructing you to run and repair automobiles at home with working models (from London), charts, etc. Indorsed by Duryea, Oldfield, Splitdorf. Send for free 32-page illustrated and interesting book. A. L. Dyke, Box 16, Roe Bldg., St. Louis, Mo.

"FORD MODEL T REFERENCE BOOK." First edition sold out in 5 months. SECOND EDITION, revised and rewritten, now ready for sale. A complete ENCYCLOPAEDIA on the FORD car. Missing located, knocks cured, overheating remedied and all the troubles of Model T prevented by referring to the index and digest. Makes old Ford cars new and keeps new Fords always up to date. Write for new 8-page circular or sent postpaid, $1.00. Ford Reference Book Co., 57 West 125th St., New York.

GAS ENGINE TROUBLES AND INSTALlation. Cloth, $1.00; flexible leather, $1.50. Automobile Troubles and How to Remedy Them. Cloth, $1.00; leather, $1.50. Ten other practical and reliable mechanical books. Send for circular.
Charles C. Thompson Co.,
1128 S. Wabash Ave., Chicago.

NEW MICHIGAN ROAD MAP (LOWER peninsula). All the roads, lakes and streams. Price $1. John F. Nellist, 1955 Jefferson Ave., Grand Rapids, Mich.

PARTS AND ACCESSORY MAKERS
The motorcycle field is well worth your attention; 75,000 new machines in 1912. Leading medium Motorcycle illustrated, 51 Chambers St., New York City. Paid circulation over 8,600.

Mailing Lists

AUTOMOBILE MAILING LISTS

13,191	Automobile Dealers	$25.00
9,627	" Garages	20.00
5,681	" Repairs	12.50
3,541	" Supplies	10.00

Neatly typewritten, showing Financial Rating in dollars of each one, alphabetically by States and Towns, 1913 compilation.
Ask for certain States if you do not want all.
877,000 Automobile Owners, by States. Price on application.
Ask for our "Silent Salesman," showing 2,000 other lists, etc.
Send check with order.

TRADE CIRCULAR ADDRESSING CO.,
166 West Adams Street,
CHICAGO.
Established 1880. Phone Franklin 1183.

AUTOMOBILE ADDRESSING AND MAILing lists; card systems; any section, any make. Auto List & Addressing Co., Buick Bldg., New York City, N. Y.

AUTOMOBILE LISTS OF OWNERS, DEALers, etc.; any state. Auto Directories Co., 1717 Broadway, New York City.

MAILING LISTS AND STATISTICS.
Owners or dealers; any state, county, city; weekly and monthly supplements at lowest prices. Special lists of electrics, trucks, Fords, Studebaker, Overland, etc.
MOTOR LIST CO. OF AMERICA,
220 News Arcade, Des Moines, Iowa.

NEW ENGLAND AUTO LIST AND TOURist includes weekly list of all N. E. Auto Owners, Garages, Dealers, etc., with maps. Selected N. E. routes and motor news, $10.00 yearly. 138 Pearl St., Boston, Mass.

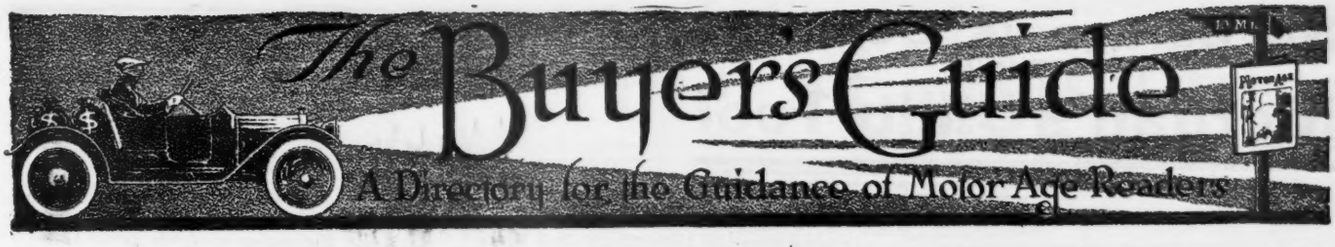
Hotels

HOTEL WYCHMERE, EUROPEAN,
Indiana Ave. and Eighteenth St., Chicago, in the very center of the automobile district; 75c to $1.50 per day; with bath, $1.00 to $2.00. Clean, comfortable rooms. Fine 40c table d'hote. Take South Side trolley to door.

Do You Need a Man?

If you need a superintendent, foreman, motor car mechanic or salesman, see our classified columns.
If you don't find the advertisement of the man you are looking for listed there, why not insert your advertisement under the heading of "Help Wanted?" These advertisements invariably bring best results.

FOR BARGAINS
SEE THE
CLASSIFIED COLUMNS
OF
MOTOR AGE



CAPACITY GURNEY ENDURANCE

Solid One-Piece Separator. Full Depth of Raceways to Resist Thrust. Uninterrupted Raceways. Full Complement of Balls.

GURNEY BALL BEARING CO.
JAMESTOWN, N. Y.

NEW CATALOG 300 PAGES Now Ready

MOTOR CAR
MOTOR CYCLE
MACHINISTS'
BICYCLE
SUPPLIES AND BICYCLES

WHOLESALE ONLY DEALERS, GET YOUR NAME IN

MOTOR CAR SUPPLY COMPANY
1451-1453-1455 Michigan Ave., Chicago

ESTABLISHED 1844.
SCHRADER
UNIVERSAL VALVES
TRADE MARK REGISTERED APRIL 30, 1895.

The Standard American Valves for Automobile, Bicycle & Vehicle Tires

Manufactured by
A. SCHRADER'S SONS, INC.
28-32 Rose Street New York, U. S. A.

Hoyt Electrical Instrument Works
Penacook, N. H.

THE FAMOUS TROY LINE

Windshields of Character

About half of the representative cars of the United States are equipped with Troy Windshields. Write for literature.

TROY CARRIAGE SUN SHADE COMPANY
Dept. C, Troy, Ohio

Automobile, Motorcycle and Bicycle Supplies

Ask for catalog "M"
Dealers only

THE BECKLEY-RALSTON CO.
Mich. Ave. & Randolph St., Chicago

R.I.V. BALL BEARINGS
R.I.V. 1771 Diway N.Y.

THE FAMOUS
Packard 30 SAE
Auto Cylinder Oil
Will not carbonize. A perfect lubricant
GREENSLADE OIL CO.

Main Office: DETROIT, MICH.
Pacific Coast Agency
George L. and J. A. McPherson, Portland, Ore.

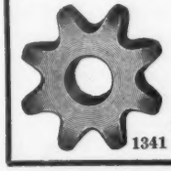
AUTO-TOP FABRICS OF EVERY DESCRIPTION

SAMPLES AND PRICES ON REQUEST

L. J. MUTTY CO., Boston

Have you seen the bargains in the classified columns of this issue?

SPROCKETS



Chains and Differential

In Stock or Order
Send for New Catalog
CULLMAN WHEEL CO.
1341 Greenwood Terrace, Chicago

Counter-Balanced Ball-Bearing
AUTOMOBILE TURNTABLES

BOOKLET ON REQUEST. AGENTS WANTED
T. C. BEACH AUTO-TURNTABLE CO.
313 Lansing St. St. Johns, Mich.

"Yankee" Muffler, Pat'd Aug. 31 1909.



The "Yankee" Silent Muffler has no complicated parts to become clogged. No back pressure, and silent. Made in various sizes. Write for free catalog.

Manufactured by
THE "YANKEE" CO., Utica, N. Y., U. S. A.

FEPS CARBURETOR

"A Giant in Power —A Miser in Fuel"

25% to 50% more mileage

Write for illustrated descriptive booklet.

Schoen Jackson Company, Media, Pa.

— Buy BETTER Springs —

Guaranteed against breakage and sagging at less price than of car factories. Freight allowed on 4 or more.



In stock, painted for Ford, Buick, Cadillac, Chalmers, Hudson, Maxwell, Regal, Reo, and others. Send for complete list and price.

NEW ERA SPRING & SPECIALTY COMPANY
247 Jefferson Ave., Detroit



AUTOMOBILE TOPS

Write for catalogue and prices.
We can save you money.
BUOB & SCHEU, Court & B'way, Cincinnati, O.

KELLY-FIELD CO. 1737 BROADWAY NEW YORK CITY

are General Sales Agents for



LEE Puncture-Proof *PNEUMATIC* **TIRES**

Lee Tires, Leeland Tires and Lee Tire Accessories

Get Trade Proposition "U"

Lee Tire & Rubber Co., Conshohocken, Pa.

All Kinds of **AUTOMOBILE SPRINGS**



Cut shows **TITANIC SPRINGS**, which have no breakage. No hole to break at. Absolutely guaranteed. If broken at center will replace and no questions asked. For any car. Take your choice. We make every pattern.

TUTHILL SPRING CO., 762 Polk St., Chicago

DEALERS

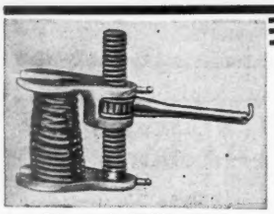
Have you received our new 1913 auto supply catalogue? Full line new goods and new prices.

Prompt shipments—our policy

Chicago Automobile Supply House
1355 So. Michigan Boulevard, Chicago

The PARISH & BINGHAM CO.
PRESSED STEEL
FRAMES
Write For Estimates
CLEVELAND . . . OHIO

No Garage is Complete WITHOUT Morgan's Utility Tool



Morgan's Utility Tool

One garage-man wrote us, "I use your UTILITY TOOL twenty times a day. It pays for itself in the time and steps it saves me in looking after tools around the shop." **Morgan's Utility Tool** is a hand vise, a clamp, a valve lifter, a drill jig, a spring stretcher, all in one simple, compact unit. It is built for a lifetime of service. No chauffeur, garage-man or factory mechanic can afford to be without one. It is the only valve lifter that holds the load both ways — won't slip.



As a Drill Clamp



As a Hand Vise

Price $2.00

At all dealers and jobbers or direct on receipt of price plus 16c to cover postage.

DEALERS WANTED EVERYWHERE

MORGAN MANUFACTURING CO.
Fir Street Newport, R. I.

Have You An Unsatisfactory Magneto?

Even if your motor has no timer shaft you can nevertheless install

The Atwater Kent Ignition System

by means of our "Magneto Gear Mounting." It fits the standard magneto platform and connects to the magneto drive shaft. The gears it contains are enclosed, smooth running and quiet in operation.



For one-half the price of a new magneto you can replace your old one with an Atwater Kent System which will run your motor as smoothly "on high" at three miles an hour as at thirty or fifty. If you are also interested in increasing the speed, flexibility and hill-climbing ability of your car, you will want a copy of our latest literature describing the Atwater Kent System.

WRITE FOR FOLDER "A"

ATWATER KENT MFG. WORKS 4934 Stenton Ave. PHILADELPHIA

Index to Advertisements

A

Ajax-Grieb Rubber Co..... 97
Albany Lubricating Co..... 120
American Ball Bearing Co.... 107
Ames Motor Car Co..... 103
Approved Auto Specialties Co. 104
Aristos, The, Co..... 90
Atwater Kent Mfg. Wks..... 118
Auburn Automobile Co..... 102
Automatic Appliance Co..... 76
Automobile Supply Mfg. Co.. 99

B

Badger Brass Mfg. Co..... 98
Baldwin Chain & Mfg. Co.... 92
Barthel & Daly..... 104
Beach, T. C., Auto Turn-Table Co. 117
Beaver Motor Mfg. Co..... 98
Beckley-Ralston Co. 117
Borland-Grannis, The, Co.... 98
Bosch Magneto Co..... 94
Bowser, S. F. & Co..... 95
Braender Rubber & Tire Co.. 107
Brictson Mfg. Co..... 104
Bridgeport Brass Co. 105
Briggs-Detroiter Co. 104
Broderick & Bascom Rope Co. 90
Buckeye Mfg. Co. 96
Buob & Scheu 117
Bryne, Kingston & Co. 109

C

Cartercar Co..... 105
Central Brass & Fixture Co.. 93
Chase Motor Truck Co..... 102
Chicago Automobile Supply House 117
Classified .....112 to 116
Cleveland-Canton Spring Co.. 109
Cole Motor Car Co. 98
Colorado Tire & Leather Co. 91
Connecticut Telephone & Elec. Co. 93
Continental Motor Mfg. Co.. 80
Corbin Screw Division..... 92
Corcoran Lamp Co..... 107
Covert Motor Vehicle Co.... 96
Cullman Wheel Co..... 117

D

Dart Motor Mfg. Co..... 101
Dean Electric Co. 105
De Soto Motor Car Co..... 102
Detroit Mechanical Starter Co. 106
Detroit Trailer Co..... 111
Diamond Rubber Co. of New York 101
Dixon, Joseph, Crucible Co... 105
Dorris Motor Car Co..... 94
Double-Fabric Tire Co..... 109
Durno Mfg. Co..... 108

E

Eisemann Magneto Co. 101
Electrical Specialties Mfg. Co. 99
Empire Automobile Co..... 52
Essenkay Products Co..... 109

F

F. I. A. T..... 101
Federal Rubber Mfg. Co..... 104
Federation of Trade Press Association 88
Ford Motor Co. 108
Frontier Specialty Co. 89

G

Gabriel Horn Mfg. Co..... 87
Gilmer, G. Walker, Jr. 103
Goodyear Tire & Rubber Co.. 97
Gramm-Bernstein Co. 111
Great Western Automobile Co. 100
Greenslade Oil Co. 117
Grossman, Emil, Co..... 108
Guide Motor Lamp Mfg. Co... 105
Gurney Ball Bearing Co..... 117

H

Halliwell Co. 96
Ham, C. T. Mfg. Co. 97
Hartford Suspension Co. 2
Haynes Automobile Co. 60-61
Haywood Tire & Equipment Co. 99
Hazard Motor Mfg. Co. 106
Henderson Motor Car Co. .. 81
Hercules Lock Co. 108
Herreshoff Motor Co. 103
Herz & Co. 99
Hess-Bright Mfg. Co. 87
Hess Spring & Axle Co. 96
Holley Bros. Co. 51
Horton, F. L. Mfg. Co. 119
Hotel LaSalle 95
Hotel Woodstock 102
Houk, Geo. W. Co. 102
Hoyt Electrical Inst. Works.. 117
Hudson Export & Import Co. ..... Cover
Hupp Motor Car Co. 94
Hyatt Roller Bearing Co. 69

I

Ideal Steel Wheel Co..... 106
Indiana Rubber & Insulated Wire Co. 53
Ingersoll-Rand Co. 100
Inter-State Automobile Co. .. 102

J

Jackson Automobile Co. 100
Jacobson Machine Mfg. Co. .. 108
Jenkins Mfg. Co. 102
Johns, H. W.-Manville Co... 105
Jones Electric Starter Co... 106
Jones Speedometer, The..... 88

K

K-W Ignition Co. 92
Kamlee Co. 91
Keeton Motor Co. 103
Kimball Tire Case Co. 103
Kinsey Mfg. Co. 98
Kissel Motor Car Co. 58-59
Knox Automobile Co. 108

Index to Advertisements

L

Lauth-Juergens Motor Car Co. 100
Leece-Neville Co. 100
Lee Tire & Rubber Co. 117
Lovell-McConnell Mfg. Co..... 47
Lozier Motor Co.....65 to 68
Lyon-Atlas Co. 54-55

M

McCue Co. 83
McFarlan Motor Car Co. 103
Mansfield Tire & Rubber Co... 89
Marathon Motor Works..... 94
Marburg Bros. Inc..... 101
Marion Motor Car Co. 103
Maxwell Motor Co. 97
Mayo Mfg. Co. 90
Mercer Automobile Co. 71
Metal Specialties Co. 91
Metz Co. 105
Metzger, C. A. Inc..... 86
Michener, E. S. 100
Model Gas Engine Works.... 91
Moline Automobile Co. 78
Moore Oil Co. 94
Morgan Mfg. Co. 118
Mosler, A. R. & Co. 107
Motor Car Equipment Co. 101
Motor Car Supply Co. 117
Mott Wheel Works..... 107
Mutty, L. J., Co. 117

N

National Motor Vehicle Co... 48
National Rubber Co. 103
New Departure Mfg. Co. 4
New Era Spring & Specialty Co. 117
New Process Gear Corp..... 108
New York & New Jersey Lubricant Co. 111
Nordyke & Marmon Co. 96
Northwestern Chemical Co. .. 93
Nyberg Automobile Works.... 96

O

Oakland Motor Car Co. 106
Old Dutch Cleanser.....Cover
Owen, R. M. & Co..... 97

P

Packard Electric Co. 109
Paige-Detroit Motor Car Co... 99
Parish & Bingham Co. 117
Pathfinder, The Co. 96
Peacock, Clarence N. & Co... 100
Pennsylvania Rubber Co..... 106
Perfection Spring Co. 111
Pilot Car Sales Co. 97
Pittsfield Spark Coil Co..... 90
Premier Motor Mfg. Co.....56-57
Prest-O-Lite Co. 99
Prosser, Thos. & Son..... 107
Pullman Motor Car Co. 104

R

R. C. H. Corp. 106
R. I. V. Co. 117
Rajah Auto Supply Co. 107
Rayfield Carburetor 82
Regal Motor Car Co.....Cover
Remy Electric Co. 95
Republic Rubber Co. 70
Rhineland Machine Works Co. 98
Robbins, Irvin & Co. 108
Roland, Chas. F. 107
Royal Equipment Co. 104
Rutenber Motor Co. 104

S

Salisbury Wheel & Mfg. Co... 107
Schoen-Jackson Co. 117
Schrader's A. Sons..... 117
Searchlight Gas Co. 101
Selden Truck Sales Co..... 84
Shaler, C. A. Co. 85
Sheldon Axle Co. 72
Sparks-Withington Co. 97
Spicer Mfg. Co. 98
Splitdorf Electrical Co. 84
Spring Leaf Lubricator Co. .. 63
Standard, The Co. 106
Standard Gauge Steel Co. 109
Standard Oil Co. 50
Standard Welding Co. 1
Star Ball Retainer Co..... 99
Stearns, F. B. Co. 73
Stewart Speedometer Factory 111
Stromberg Motor Devices Co. 45
Stutz Motor Car Co. 77
Suspension Roller Bearing Co. 101
Swinehart Tire & Rubber Co. 98

T

Timken Roller Bearing Co.... 64
Troy Carriage Sunshade Co... 117
Tuthill Spring Co. 117
Twichell Gauge Co. 99

U

U. S. Light & Heating Co..... 95
United States Tire Co. 74
Universal Mfg. Co. 111
Universal Portland Cement Co. 86

V

Veeder Mfg. Co. 93

W

Ward Leonard Electric Co.... 100
Warner Gear Co. 79
Warner Mfg. Co. 97
Weed Chain Tire Grip Co. .. 102
Weston-Mott Co. 96
Wheeler & Schebler 46
Whitney Mfg. Co. 3
Willard Storage Battery Co... 49
Willys-Overland Co..... 75
Winton Motor Car Co. 62
Wisconsin Motor Mfg. Co. .. 94

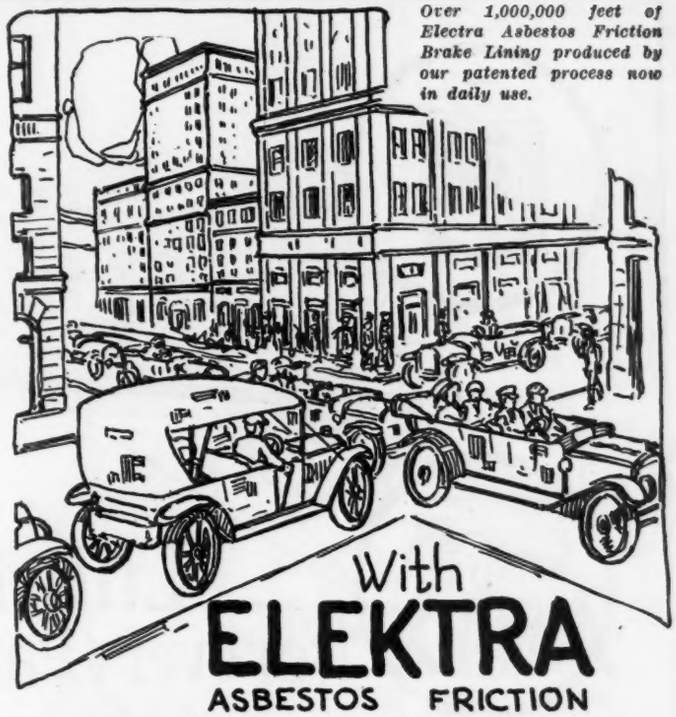
Y

Yankee Co. 117

Z

Zenith Carburetor Co..... 105

Over 1,000,000 feet of Electra Asbestos Friction Brake Lining produced by our patented process now in daily use.



With
ELEKTRA
ASBESTOS FRICTION
BRAKE LINING

you are safe on every road

On the steepest hill or the slipperiest pavement, your safety is measured only by the power of your brakes. Therefore you should insist upon the brake lining that **adds to the power** of your brakes—that gives to them the greatest factor of safety in operation.

ELEKTRA ASBESTOS BRAKE LINING is produced by a patented process which gives better wear and longer service than any other facing. ELEKTRA will not burn, char, slip or be affected by oils, water, vapor, etc.

We will send you a sample—and information—for the asking.

F. L. Horton Mfg. Co.
36 Whittier St.
BOSTON, MASS.



Lubricants for every Part of the Car

We make lubricants specially compounded for the different parts of automobiles. The above diagram shows where each should be used. We have prepared a chart showing just what consistency of our different greases should be used in each place in winter and summer. Ask for a copy.

Albany Grease The 45 years' record in back of Albany Grease has made it the recognized standard for use in all automobile grease cups, axle caps and roller or ball bearings. Its remarkable purity and freedom from injurious ingredients prevents gumming and insures cool, quiet running bearings.

Cook's Lubricant This is a special product for lubricating gears. It has a remarkable capacity for hanging on to revolving gears and getting in between the rubbing surfaces. It cannot be packed aside, it does not leak out of the gear cases. It is neither a solid grease nor an oil—it has the good qualities of each but none of their drawbacks.

Albany Auto Oils Albany Auto Oils meet specifications of the Automobile Associations and car manufacturers and give the best of lubricating service. These oils are strongly recommended for their power saving properties, their durability, their high lubricating qualities, their economy and their uniformity. Our lubrication chart shows where to use the **Extra Light, Light** and **Medium** oils.

To Dealers Our New Dealer proposition with its dealers' helps is an attractive one. Ask us about it.

COOK'S LUBRICANT DEPARTMENT

ALBANY LUBRICATING CO.

ADAM COOK'S SONS, Props.

708-710 WASHINGTON STREET NEW YORK CITY

106

1st Aid In Cleaning



Old Dutch Cleanser

stands first in **finding** uncleanliness and first in **removing** it.

Where dirt and grime stick hardest, and stains and discolorations are most stubborn, Old Dutch Cleanser takes hold with extra power.

Lavatories, floors, woodwork, need it. Absolute cleanliness and sanitation come with the use of it.

Old Dutch Cleanser never fails to clean — quicker and easier than anything else.

Many Uses and Full Directions on Large Sifter-Can— **10c**

Regal

Your Problem— Our Solution

As a dealer you have many individual problems—created by local conditions. But primarily, this is the big issue with you:

The distributing of a car that will fit the needs and the pocketbooks of 90% of the car-purchasing public.

And here's a truthful, significant fact that commands your serious attention:

Up until June, the majority of automobile dealers in this country who actually sold their allotments, carried cars that sold for less than $1,200.

Among the successful ones, in many sections of the country, were dealers in

Regal Cars—Selling Around $1,000!

The solution to your problem is simple.

Become a Regal dealer. Regal cars challenge comparison in point of constructional superiority, efficiency, dependability and beauty.

Our Underslung Cars Are Favorites the World Over

The Regal Underslung cars insure a maximum of safety. They are *built to* and *do overcome* the dangers of skidding and "turning turtle." A Regal will cling safely to a 60° embankment.

You can prove that Regals conduce to gasoline and tire economy. The straight shaft drive transmits all power to the rear axle. The distinctive spring construction greatly reduces the wear on tires.

You can point to the low, sweeping, rakish lines of the Regal Underslung, and know that in point of beauty it is unchallenged.

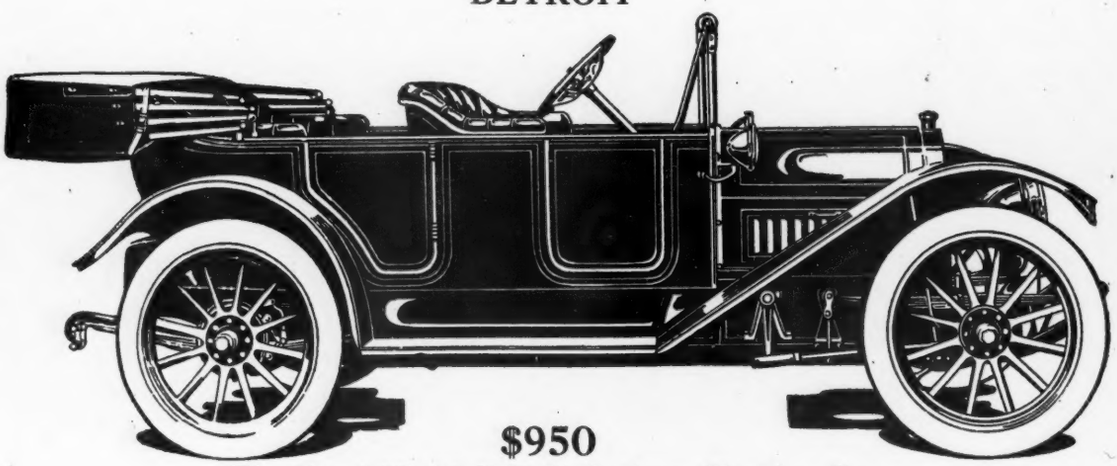
Our line is broad and meets all demands. The Regal prices are all around the $1,000 figure. Our Underslung Touring Car and Roadster are favorites all over the world.

We have a good car, a good price and a good proposition for wide-awake, progressive dealers. Write us today, and we will explain our plans immediately. It will obligate you in no way. Get in touch with us at once.

Ask for Catalog M.

Regal Motor Car Company

DETROIT



$950

The Regal Model "T" Underslung Touring Car

Extra equipment, top, windshield and speedometer — $75

(93)